The Enigmatic Reality of Time

Ancient Mediterranean and Medieval Texts and Contexts

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Studies in Platonism, Neoplatonism, and the Platonic Tradition

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VOLUME 7

The Enigmatic Reality of Time

Aristotle, Plotinus, and Today

By
Michael F. Wagner

BRILL

LEIDEN • BOSTON
2008

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Wagner, Michael F., 1952-
The enigmatic reality of time : Aristotle, Plotinus, and today / by Michael Wagner.
p. cm. -- (Ancient Mediterranean and medieval texts and contexts, ISSN 1871-188X ; v. 7)
Includes bibliographical references and index.
ISBN 978-90-04-17025-4 (hardback : alk. paper) 1. Time. 2. Aristotle. 3. Plotinus. I. Title.

BD638.W28 2008
115--dc22

2008028983

ISSN 1871-188X
ISBN 978 90 04 17025 4

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PRINTED IN THE NETHERLANDS

"From infancy I came to boyhood, or rather it came to me, taking the place of infancy. Yet infancy did not go: for where was it to go to? Simply it was no longer there. For now I was not an infant, without speech, but a boy, speaking."

Aurelius St. Augustine, *Confessions* I.8 (Sheed transl.)

Time is the feature of existence in virtue of which, as its contents and constituents proceed and change, what was no longer is *and what will be* is not yet.

M.F. Wagner

CONTENTS

Introduction 1

PART I. DIMENSIONS OF TIME'S ENIGMA

1. Is Time Real? 19
2. Eleaticism, Temporality, and Time 43
3. The Makings of a Temporal Universe 65
   3.1. Pastness and Futurity 65
   3.2. Synchronicity and Asynchronicity 80
   3.3. Temporal Pace and Measurement 102
   3.4. Presentness, or the Present 121

PART II. ARISTOTLE'S REAL ACCOUNT OF TIME

4. Parmenidean Time and the Impossible Now 149
5. Cosmic Motion and the Speed of Time 167
   5.I. Time as the Motion of the Cosmos 168
   5.II. Time as the Cosmos Itself 178
   5.III. Time as Motion and All Change 179
6. Temporal Cognition and the Return of the Now 189
7. Real Temporality in an Aristotelian World 213
8. Does Aristotle Refute Eleaticism? 243
   Bisection Argument I 253
   Bisection Argument II 255
   Bisection Argument III 257

PART III. PLOTINUS' VITALISTIC PLATONISM AND THE REAL ORIGINS OF TIME

9. Temporality, Eternality, and Plotinus' New Platonism 275
10. Plotinus' Critique of Aristotelian Motion 289
11. Indefinite Temporality and the Measure of Motion 313
12. Plotinus' Neoplatonic Account of Time 339

Bibliography 365
Index 373

INTRODUCTION

In recent decades, the nature of time has come to be viewed in Anglo and American letters as principally a topic of scientific expertise—and, among scientific disciplines, especially physics. Ask general readers having an interest in the topic whom to read to learn about time and a likely response would be the renowned physicist Stephen Hawking. Time thus finds itself alongside quarks and quanta, photons and neutrons, forces and fields, and other such theoretic bric-a-brac posited and(or) investigated by contemporary physics—even though conceptually it is not comparable to any of them.

Time's status and character as, rather, properly a philosophical topic is most clearly articulated in the context of answering the fundamental question: Is time (even) real? For, answering this question requires a reasonably clear idea of what to look for in order to make this determination—both in virtue of the sort of question it is (What does this question demand of time in order for the answer to be that, yes, time is real?) and in the particular case of time itself (What does 'time' denote such that this must be real in order for the answer to be that, yes, time is real?).

It may be that what this question demands of time is indeed for it to exist as a proper object of scientific study; and so, concordantly, that what 'time' must denote is just what science states or implies that it denotes. But this cannot just be assumed.

Indeed, one can (and I will) ask whether what 'time' is used to denote in contemporary science (in particular, physics) is in fact time at all; whereas, it would seem odd and out of place to ask whether what physics uses the term 'quark' to denote is in fact a quark (or, are quarks)—or, at least, one would be asking a very different sort of question in this case.

From very early on in recorded (Western) philosophical thought, investigation into the nature of time has been driven by the question: Is time real? Understanding the meaning and intent of this question, and its demands and implications regarding the (possible) nature of time, is therefore central to investigating time's nature. A rudimentary

intimation and sense of this question also stimulated my own interest in the topic.

Consider, for instance, that as I write this I have several decades of life to recollect and mull over; and, I envision, a few more to speculate and dream upon. An autobiographical synopsis of my current life circumstance might include, for example, that my father is recently deceased and my mother now resides in Austin, Texas, where my brother is a molecular-semiconductors engineer. My sister teaches art; and she is now a twice-grandmother. I am a Professor of Philosophy at the University of San Diego. My hair is grey-white, my glasses bifocal. I have a sporty new car; and I am herein completing a project I began approximately seven years ago.

A year ago, such an autobiographical synopsis would have been similar in some respects and different in others. It could have included some of these items but not others; and it might have included items which this current one could not. As an elementary-school assignment, a listing of some salient life facts would have differed entirely from this current synopsis. A year from now, at the very least my father's death will not be so recent, nor my car so new; and (I anticipate) this project will be entirely finished.

Over time, assuredly other items in this synopsis will no longer pertain to my life circumstance, even while different ones would. Yet, as I write this, this is indeed an accurate autobiographical synopsis; whereas, the one I might have composed in elementary-school would not be and, very likely, nor would a thirty-years-hence one.

Indeed, the phrase 'as I write this' is itself a source for some consternation, even as I write it. I first wrote the phrase on May 12, 2007. I almost entirely rewrote the paragraph which uses the phrase—including retyping the phrase itself—on May 17, 2007. Precisely when is the "as I write this" when I am writing [wrote] this? And, even, precisely what is the "this" which is properly what I am writing "as I write" it? The phrase? Just the word 'this'? And, which iteration herein of the phrase, or the word?

Engrossed in reading a good book, enraptured by the eyes of your beloved, one suddenly notices the hours which have passed and wonders: Where has the time gone? Indeed, where does time go? This prosaic-sounding question was a principal inspiration for this project. It also is more subtle than it might at first seem.

The notion that time "goes" somewhere does sound strange. And yet, it can seem at times that life (our environment, perceptions,

thoughts, bodily changes and processes) is quite literally passing by us, and through us.

Unlike most sentient creatures, human beings do not merely perceive. We, philosophers sometimes term it, *ap*perceive. We perceive that we perceive, as we perceive. Consequently, we seem equal parts part of the world and apart from it. We are aware of things even while we are aware because of things, and because we ourselves are "things."

Our bodies, our circumstances, what we perceive and feel, are firmly anchored in, fully participants in, the inexorable proceedings of our world, as things come-to-be and pass away, as events and changes follow one after another, in the ongoing history of existence, of what exists and what happens, as it exists and when it happens. And yet, we—our selves—seem as much observer as participant, along for the ride as much as part of it; and one might wonder: Why me, here, now, in these particular circumstances, in this particular way, at this particular stage of my self, of my life, of the world, of existence?

This may sound akin to the teaser: Why am I me? To which the best answer may be just: Because *someone* has to be!

But, my being me is entirely consonant with (indeed, in a way demands) your being you, her being her, and his being him. That each of us, every "me," is who we are (is the particular apperceiving, reflective consciousness we are) and not someone else (not any other such consciousness) is integral to humankind's psychical dispersion and individuation wherein it just in fact happens that I am the self I am, you are the self you are, *et cetera*. Whereas, my current sentient life circumstance is not consonant with that of one year ago, nor of thirty years ago, nor of one year nor thirty years hence.

It in a way does "demand" these other existential states-of-my-affairs. I would, at the very least, not be existentially situated as I currently am were it not for all that preceded it. Still, the sentience I am is just the one I currently am and not any I was previously. Or, stated otherwise, the sentience I am is existentially situated just as it currently is and not as it was anytime previously.

My own temporal existence is not dispersed (nor individuated) comparably to the various diverse apperceptive beings populating Earth concurrently with me, with my current existential circumstance. My own temporal existence, rather, is just what it currently is; and it is not otherwise (or perhaps "otherwhen") than it currently is. Or, so it seems to me, as I write this.

Clearly, time is not merely another feature of the natural world on a par with its elemental constituents and processes—the proper objects of physics, of the particular expertise of physicists. A possible implication of this, though, is that therefore time is not a feature of our universe at all.

There are two primary senses in which time may prove to be unreal. Perhaps the term 'time' simply does not in fact denote anything. Alternatively, what the term 'time' in fact denotes may not be time. Explaining these two primary senses in which time could be unreal—exploring their meanings, and their implications for the nature of time (if it is to be real)—is the principal topic of Part I of this book.

Chapter 1 articulates two sorts of motivations why someone might question the reality of time, while explicating the notion that it might then in fact be unreal in the first sense—in that 'time' does not denote anything, or that nothing in reality exists for 'time' to denote. One sort of motivation involves inspecting what does in reality exist, what does constitute or populate real existence. A second sort of motivation considers whether the notion *time* is even coherent, and so capable of denoting at all.

A principal consideration along the way is how *internalization* approaches to the nature of time might pertain to the question of time's reality. Chapter 1 explains what internalization approaches claim and seek to achieve in regards to time; and it argues the thesis that such approaches either in fact constitute denials of time's reality or else they simply do not address the question, they in fact do not pertain to it.

In this connection, I also shall introduce the problem of concordance between our temporal concepts and the actual things and phenomena we typically take them to denote; and I shall consider the notion that we possess an inner time-sense of sorts—for example, as a particular feature or capability of awareness and thought itself, or as a consequent of certain bodily rhythms ("biological clocks").

Another thesis of my investigation is that the question of time's reality first and foremost pertains to the natural world. Insofar as the question of time's reality resonates with our common inquisitive nature as human beings, this is how most of us implicitly conceive of the question. This also, I think, partly explains why contemporary letters has allowed scientists so silently, even unnoticed, to proceed and to write as if time was just another object for scientific scrutiny and expertise. Certainly, chapter 2 begins to demonstrate, this is how the classical Greek philosophical tradition conceived and approached the question.

This implicitly *naturalistic* character to my investigation intimates that the question of time's real existence may be reformulated as: What makes our universe a temporal universe? Or, what is it about our purportedly temporal universe which renders it indeed a temporal universe?

Chapter 2 introduces this approach while explaining and considering certain claims made by contemporary physicists (beginning with Einstein) regarding the nature of time. These claims center around the so-called "arrow of time," its purported relation especially to entropy, and science's space-time conception of natural existence. Contemporary scientists' approach to time, however, is exemplary of the second sense in which time may be said to be unreal—in that what the term 'time' denotes is not time.

Chapter 2 also introduces two distinctions regarding the nature of time: one between cyclical and linear conceptions of time, the other between static and dynamic conceptions of time. The former distinction, I explain, is bogus. It is a pseudo-distinction. The latter distinction is indeed fundamental to investigating the nature of time. In these terms, the space-time conception is a prime example of a static conception of time.

Beginning already with a group of classical Greek philosophers known as *Eleatics*, however, the question of time's reality has concerned whether natural existence is dynamically real, whether the existential nature of our universe is dynamic (and not static) in character. Accordingly, static conceptions of time in fact are not conceptions of time's real nature but rather constitute denials of its reality.

Chapter 2 also tentatively distinguishes time and temporality. The latter notion, in part due to its tie to our human experience of time, pertains to time as dynamic in character. In these terms, we may say that static conceptions of time sever time from temporality; whereas, as I explain in introducing key elements of classical Eleaticism, the question of time's reality demands that time as temporality be real. Otherwise, *time* is an empty concept. Insofar as 'time' might still be used to denote something, what it denotes is not time.

Chapter 3 investigates four principal notions commonly associated with temporality: the distinction between past and future; the distinction between synchronous and asynchronous existents or phenomena; time as something which moves or passes (and is potentially measurable in that regard); and temporal presentness, or the present.

The Late 19th Century philosopher John McTaggart was pivotal

to how contemporary philosophers approach the distinction between static and dynamic conceptions of time. McTaggart distinguished, according to the standard rendition of his thought, between conceptions of time which associate it with a (fixed) sequential ordering of time differentiations (for example, a sequence of times, or times-when) and ones which associate it with a continual, ongoing division between past and future (or, past-times and future-times). McTaggart is standardly rendered as maintaining that these two ways of characterizing time's arrow are irreducible to one another (indeed, they are incompatible), and as in effect construing the former to be indicative of static conceptions of time and the latter to be indicative of dynamic conceptions of time.

Subchapter 3.1 demonstrates the fallaciousness of this rendering of McTaggart's thought. McTaggart in fact embraces the thesis that a static account of time is in fact not an account of time at all but instead constitutes a denial of time's reality. But, although McTaggart is entirely consistent on this point, the confused character of his investigation may be seen in the fact that his own account of past and future (which he, indeed, maintains is fundamental to, and even definitive of, dynamic conceptions of time) turns out to be itself static in character instead.

Subchapter 3.1 also contrasts contemporary philosophers' (for example, McTaggart's) tripartite division of time into past, present, and future with the more traditional (and classical Greek) dyadic division of time into past and future. It also contrasts all-or-nothing conceptions of real (temporal) existence from graded or "fuzzy" conceptions. It introduces the topic of substance and (or) persistence in regards to dynamic conceptions of time; and it introduces as well ways in which one may conceive of natural existence as itself dynamically temporal in character.

Pastness and futurity may be associated with a given temporal existent, with temporal existence as a whole, or with some multiplicity of temporal existents. In this last case, however, multiple temporal existents (or phenomena) are also related to one another temporally by virtue of being synchronic or asynchronic in relation to one another.

Subchapter 3.2 contrasts synchronicity and asynchronicity as distinctly temporal notions from other sorts of concurrence and nonconcurrence. It proposes that their distinctly temporal character depends on the more fundamental notion of same-timeness (or, simultaneity); and it discusses two sorts of complications regarding this notion.

On the one hand, Jean Piaget's experimental work with children in effect postulates that simultaneity is not a purely experiential phe-

nomenon but requires a certain level of cognitive development and attainment for its proper application to (or in) experience. On the other hand, Einsteinian Relativity Theory is normally construed (beginning by Einstein himself) to deny simultaneity, or the cogency of sametimeness, altogether.

Subchapter 3.2 critiques Piaget's and Einstein's respective analyses and inferences. In both cases, their reasoning presupposes rather than demonstrates their results concerning simultaneity. Still, time, insofar as it is a real feature of natural existence, does seem especially closely related to motion and change; and, I speculate, perhaps time is a sort of reality which can differ with respect to itself. In other words, perhaps time is as such a malleable sort of reality, or real feature of existence.

What does it mean to "measure" time (or its passing)? Or, what is meant by supposing, as we commonly do, that time (or its passing) is measurable (or, in general terms, quantifiable)? Subchapter 3.3 explicates and explores the thesis that how we commonly think about time today reflects a "modernizing" or "civilizing" of time. Emblematic of this process, as well as fundamental to it, is the historical development of time-keeping devices (clocks) since the 14th Century, and the related conceit (coined in 1377) that nature comprises a (the) "clockwork universe."

Subchapter 3.3 returns to the problem of concordance between our temporal concepts and the actual things and phenomena we typically take them to denote, and explains that, in any case, ours in fact is not a clockwork universe. Correcting the common mis-ascription of this conceit to the classical Greek philosopher Plato will also provide instructive context for clarifying the distinction between "modern" time and more native, or experiential, time—including in regards to time's significance and role in human society and behavior—and for introducing a distinction between fine-grained and coarse-grained conceptions of temporal measurement or quantification.

Subchapter 3.4 considers a provocative proposal that time (the temporality of natural existence) is real, and yet it is existentially dependent on temporally aware beings (for example, humankind). In the absence of any such beings, this proposal posits, what would especially be missing from reality is "the present"; and the present, or presentness, is integral to temporality—including to pastness and futurity, to sametimeness, and to temporal passingness and delineation.

This proposal, though, need not amount just to another internalization of time. For, while temporal presentness (according to this pro-

posal) is irreducible just to what in reality exists (to "is-ness" as such), it is also irreducible to intentional present-to-ness, to presence-to sentient (temporally aware) beings. Temporal presentness should also be distinguished from another notion—the "specious present"—which I argue in fact should be abandoned for both empirical and conceptual reasons.

An extraordinary classical Greek thinker named Parmenides first posed the question: Is time real? More precisely, Parmenides propounded, and sought to prove, the thesis that time is not real. Another extraordinary classical Greek, Aristotle, subsequently undertook the first detailed investigation into the nature of time in response to Parmenides' challenge.

Part II looks in detail at Aristotle's investigation of time in Book IV and part of Book VI of his *Physics*. Contemporary scholarship, I contend, has treated Aristotle's investigation superficially and piecemeal. A detailed look at his investigation uncovers a more subtle and intricate account of time than has been supposed, or at least portrayed.

The overlooked complexity of Aristotle's investigation begins at its outset. The gist of Parmenides' core argument for denying real existence to time asserts: Time consists of past and future. The past no longer is, and therefore is not. The future is not yet, and therefore is not. Therefore, time is not (real). Fundamental to understanding Aristotle's account of time is recognizing the fact that he agrees with this argument. Almost. More precisely, he agrees with its premises but modifies its conclusion in a subtle but significant way.

The Parmenidean argument, according to Aristotle, does not establish that time is unreal *tout courte*. It establishes, rather, that time is not real *toute courte*. More precisely, it establishes that either time is unreal or else it is real but only "dimly, barely, confusedly."

A principal thesis of Part II is that Aristotle intends his account of time to comport with this latter alternative. Aristotle maintains that time is neither entirely real nor entirely unreal, but real in some intermediate sort of way.

While introducing Aristotle's investigation, Chapter 4 also attends to his discussion of challenges to time's reality. In addition to Parmenides' core argument, these include a pair of arguments meant conjointly to demonstrate the absurdity (and so impossibility) of "the now." A motivation for this pair of arguments seems to be that, although (we shall see) Aristotle rejects the notion that time consists of "nows," this notion is the principal alternative to Parmenides' notion that time consists of past and future.

The two arguments concerning "the now" also introduce fundamental considerations relating to Aristotle's later rehabilitation of "the now"—for example, that it must be either always different or else forever the same. Aristotle's discussions of challenges to time's reality, accordingly, introduce key components and context to his own account of time later in Book IV.

That time is not unreal *tout courte* derives in part from its relationship to motion and change. Ours is a temporal universe—temporality is a real(ish) feature of our universe—in part because it is the universe of "coming-to-be and passing away," of motion and change. Chapter 5 discusses Aristotle's critiques of approaches to time which, however, inappropriately or too closely associate time with motion and change.

The two principal sorts of approaches Aristotle criticizes are ones which ground time's reality in the motions or circuits of the Heavenly spheres of Platonic cosmology; and ones which go so far as to equate time with motion and change. Once again, canvassing his critiques of "other doctrines" is important to introducing and discerning key features of Aristotle's own account of time—for example, his notion of time's universality and ubiquity, and his distinction between determinate time and time-as-such.

The initial phase of Aristotle's positive account of time may surprise some, inasmuch as it focuses on temporal cognition rather than directly on time (or reality) as such. Aristotle maintains, however, that human cognition conforms to, is congruent with, the denizens, constituents, and real features of our cosmos. This is especially the case insofar as our cognitive processes and processings are entwined with our sensory perceptions—our awareness of things through and in virtue of our five sense modalities (vision, hearing, taste, touch, and smell). In this regard, Aristotle in fact insists that time is itself perceptible, and in fact denies the existence of any imperceptible time(s).

Chapter's 6 and 7 do at times look beyond the confines of Aristotle's *Physics* to discern and explain how he understands the relationship between time and temporal cognition. Some of Aristotle's remarks in *Categories* and *On the Soul*, for example, help clarify how he could consider time to be itself perceptible (or, a perceptible). Especially intriguing in this regard, though, is Aristotle's discussion in *On Sense Experience and Sensible Objects* of "the transparent," or transparency, as in a perhaps unobvious way also something that is perceptible (or, is a perceptible).

Time's status as a real object of human perception and cognition,

though, depends in part (but crucially) on sensory perception's close, interactive relationship with memory. Aristotle in effect shares with cognitive psychologists today the notion (which will be discussed in Chapter 3.4) that sensory perception is essentially indistinguishable (or at least inseparable) from short-term memory.

Perception's interaction or interface with memory is for Aristotle integral especially to perceiving time's passing and to delineating or "measuring" time, and to making comparative judgments with respect to time—for example, regarding speed differentials. This latter context is where Aristotle asserts that "time is the measure of motion with respect to before and after"—that, insofar as we "measure" a motion in a manner pertaining to its temporality, we may be said to be measuring (delineating) time.

Aristotle maintains that, although our cognitive abilities with respect to time derive from (or develop in connection with) aspects of our perceptions and cognitions of motion (and also of space), their proper objects (natural existents' temporality) are nevertheless (*quasi*-)real as such. Chapter 7, accordingly, pays closer attention to the "reality" side of temporal cognition's relationship to reality, or real existents.

An integral component in Aristotle's account of time is a reemergence of the previously deconstructed notion of "the now." Aristotle's "now" is both always different and forever the same, in a manner which takes into account the arguments posited previously to prove its absurdity. Aristotle understands "the now" to be a feature of temporal cognition (and hence indeed not to be a constituent of time, nor to be itself a real existent) which, however, denotes or concords with a (*quasi*-)real feature of natural existence—in particular, its unending existential progression as this continuously, incessantly, ever-anewedly demarcates what no longer is and what is not yet.

Although Aristotle accepts Parmenides' core argument against the reality of time (with his crucial emendation of its Eleatic conclusion), he is intent on rejecting arguments articulated by Parmenides' student, Zeno of Elea, to deny the reality of motion. Time's (*quasi*-)real status depends in part on its relationship to motion (or, rather, to motion's dynamically progressive character)—or, in more general terms, to the "motion" (to the dynamical progression) of natural existence. It would, accordingly, be problematic for Aristotle's account if Zeno successfully proved that motion itself is unreal. Responding to Zeno's arguments against motion, and their purported implications regarding time, is a chief topic in Book VI of Aristotle's *Physics*.

There is some possibility that construing Zeno's arguments to presume a potentially problematic (for time) connection between time and motion is misguided. Peter Manchester, in particular, has argued for an alternative understanding of Parmenides' own arguments and remarks concerning time.

The common and traditional interpretation of Parmenides' intent is the one presented by Aristotle and presumed in this investigation: namely, that the unreality of past and future implies the unreality of time. Manchester has in effect argued, however, that Parmenides' intent regarding time is not this traditionally purported implication but instead is to relate time to "the now" instead, such that "Now is the time of being, and the being of time is the 'all at once total'" [Manchester, *Syntax of Time*, 128].

Arguably, though, if the usual understanding of Parmenides is mistaken, then the usual understanding of his protege Zeno's intent regarding time would likely be mistaken as well. We shall see that Aristotle's responses to Zeno's argument do, however, all involve considerations pertaining to time—most assuredly regarding its nature (and relation to motion) but seemingly regarding its existential status or character as well.

In any case, a common characteristic of Aristotle's responses to Zeno's arguments, I argue, is that they all fail. Chapter 8 explains how they, in particular, uniformly beg-the-question. This is especially evident from the fact that Aristotle's remarks concerning motion and time in his responses to Zeno are compatible with Zeno's own perspective (his Eleaticism), unless they are supplemented by Aristotle's previous account of time in Book IV. If we suppose that Aristotle himself had in mind his Book IV account, accordingly, we can then understand why he would think that his responses in Book VI are in fact adequate after all.

Chapter 8 also considers Aristotle's discussion of motion in terms of his signature description of motion as the actualization of a potential. This discussion may pertain to his attempt to respond to Zeno inasmuch as he uses this description in part to argue that motion is neither entirely real nor entirely unreal, but is "incompletely" real in a manner "intermediate" between reality and unreality. Accordingly, he may be proposing a gambit regarding motion *contra* Zeno comparable to his gambit regarding time in the face of Parmenides' argument. Aristotle, however, also attempts there to demonstrate a bizarre thesis that every (finite)motion has a temporal ending but none have a tempo-

ral beginning—perhaps as another way to respond to Zeno at least in some fashion or other.

The other Classical pillar of Western philosophy—Aristotle's teacher, Plato—did not undertake (or, at least, compose) a sustained investigation into the reality and nature of time. Until relatively recently (in the latter 19th Century), however, Platonism was identified with what scholars have since dubbed *Neoplatonism*—whose nominal founder, Plotinus, devoted an entire treatise to the topic of time.

In the Platonic tradition, the keynote conceit for characterizing time is Plato's remark that "time is the moving image of eternity." Plotinus intends his treatise, appropriately titled by Porphyry *On Eternity and Time*, to explicate this conceit. Equally significant, Plotinus therein also critiques substantive aspects of Aristotle's account of time.

My treatment of Aristotle's investigation into the reality and nature of time centered on the unique thesis that his account attempts to steer a middle course between entirely rejecting and entirely asserting time's real existence. My explication and discussion of Plotinus' investigation also takes a novel approach—in particular, positing that Plotinus' account of time is most properly and accurately understood by locating it firmly in the Classical tradition of Greek naturalism, wherein time is real if and only if the natural universe is in reality a (the) temporal universe. This aspect of Plotinus' account is typically overlooked owing, I argue, to an inadequate understanding of and attention to his philosophical methodology.

Plotinus' Neoplatonic methodology for explaining something's existence and nature holds that an existent's nature is contained in (preexists in a more fundamental sense or manner) in its cause; or, stated otherwise, that an effect is an expression or manifestation of its cause, or of whatever in or regarding its cause it is an effect *of*. Plotinus further posits that natural existence is a consequence, manifestation, enactment, effect of a more fundamental sort of existence: Soul. Consequently, for Plotinus, time (the temporality of natural existence) preexists in a more fundamental sense or manner in Soul, where "more fundamental" here implies in an ontic sense or manner which is not itself temporal. Soul, therefore, is prior to temporality and yet is its cause. Time as temporality—that is, time as we know it, think of it, experience it—derives from whatever in or regarding Soul accounts for our universe's temporality, even while Soul itself is as such not a temporal existent.

Soul, in Plotinus' philosophy, is however part of a complex structure of existential grounds or causes, which includes also "Intellect" and

"the One." Within that metaphysical structure (as such and as it relates to the natural universe), Soul is itself ontically complex.

I do not attempt nor pretend to adequately address this complexity; but note here that, of the four main levels or ontic modes of Soul normally distinguished for Plotinus—namely, the existential ground ("hypostasis") soul, species soul(s), the world soul, and individual (especially, human) souls—most of Plotinus' account of time seems to pertain to the world soul, and its relation to our cosmos. Nonetheless, I shall continue capitalizing 'Soul' in what follows to mark the fact that hidden complexities lie within any discussion of Soul in Plotinus' philosophy. Chapter 9 explicates some main aspects of Plotinus' methodology and philosophy pertinent to his investigation of time in *On Eternity and Time*.

Like Aristotle (and Classical Greek philosophers generally), Plotinus considers the temporality of natural existence to be especially closely related to its "becomingness"—to its coming-to-be and passing away, to its motions and changes. Chapter 10 explicates Plotinus' conception of motion in the context of a critique of Aristotle's conception of motion which Plotinus composed immediately prior to his treatise on time.

A pivotal point of departure for Plotinus' critique is Aristotle's notion that motion is an "incomplete," "intermediate" sort of real existent. Plotinus considers this wrong-headed, even absurd.

A motion, according to Plotinus, is not some not-yet-(fully)-actualized actualizing of some non-actual potential. It is itself a certain distinctive sort of actuality. In particular, it is an actual potency, an active power, manifesting itself in a certain manner (or effecting a certain consequent actuality) in the natural world. In Plotinus' terms, a walking-motion, for example, may be thought of as a certain active, or acting, power in virtue of which someone's legs and feet are moving in a manner we recognize to be an instance of walking. Plotinus, accordingly, not only denies that a motion is real only in some partial or intermediate sense; but he in fact asserts that a motion is as such more real than its sense-perceptible (in a way, even its material) manifestations and effects.

In his treatise on time, Plotinus also criticizes Aristotle's conception of the relationship between time and motion. Chapter 11 explicates Plotinus' critique of "other approaches" (than his own) to time's relation to motion, as this introduces and articulates pertinent aspects of his own approach. Plotinus again pays special attention in this regard to Aristotle's approach.

Part II of my investigation emphasized the importance of not over-simplifying Aristotle's account of time, of not isolating and abstracting

particular remarks or discussions in Book IV of his *Physics*, if one hopes to understand his account at least reasonably well. Plotinus, unfortunately, contributes to the long-standing practice of reducing Aristotle's approach to his remarks relating time to certain measures (or measurings) of motion.

Plotinus' principal concern regarding Aristotle's approach, however, is more general. It, in particular, concerns the way Aristotle renders time derivative from (even though not identical to) motion. Plotinus argues especially that Aristotle has the relationship between time and motion backwards—that, rather, motion exists or occurs "by virtue of" time, that natural existents dynamically proceed in virtue of how time accounts for our universe's temporality.

Chapter 12 focuses on Plotinus' own account of time, on the one hand, as a real feature of natural existence and, on the other hand, as explicable in terms of Soul's existential causality. Soul effects natural existents and phenomena sequentially—one-and-again-another, or part-by-part. In terms of Plotinus' Neoplatonic methodology, I argue, 'time' denotes this aspect of Soul's nature and functioning.

Plotinus, however, also (like Aristotle) considers pastness and futurity fundamental to the nature of time as we know and experience it in the natural universe—that is, to real temporality. But, although Soul acts sequentially, it does not as such act temporally. From Soul's own perspective, as it were, it always is doing (enacting, effecting) just whatever it is doing (enacting, effecting).

Pastness and futurity do not exist for Soul as such. Plotinus' account of motion established the real existence of motion—indeed, that (natural) motions are in a way more real than their perceptible (material) manifestations and effects. Inasmuch as (natural) motion is dynamical in character, accordingly, the integral presence in natural existence of motion as active power may be thought of as the locus of reality's temporality—or at least of our awareness of it.

Plotinus, accordingly, does not divest pastness and futurity of their temporal meaning. He does not suppose that soul's sequential mode of acting establishes a sequence of times, for example, and then reduce pastness just to times prior to any arbitrarily given time and futurity just to times subsequent to any arbitrarily given time in that sequence.

The (metaphysical) motion of Soul causatively responsible for natural existence's temporality (and so for natural motion's dynamicism) is thus a fundamentally different sort of motion from anything we may encounter in our natural environment. Soul "moves," on Plotinus'

account, just by "shifting" from one (causative) activity to a next one. This atemporal or preter-temporal motion, however, results in a sort of reality (natural existence) wherein what Soul is not effecting but has effected *no longer is* and what soul is not effecting but will effect *is yet to be*.

Consider the phenomenon of cinematographic motion, wherein a series of still frames projected in front of a moviegoer is discerned as a continuously proceeding cinematic universe. Abstracting from the film that would be moving through an actual movie projector (in our physical universe), we may think of the projector as atemporally "shifting" from projecting one still frame to projecting the next. The movie projector here is, of course, an analog of Soul, and its projectings (abstracting from the movie screen on which they fall) analogs of Soul's ontically generative activities. What, though, would be analogous to the moviegoer's discernment of the projected frames as dynamical existents—that is, her discerning the frames' contents as constitutive of a dynamically real cinematic universe?

In Aristotle's account, the *quasi*-real temporality of natural existence was discernible owing to human cognition's congruence with reality, and especially in virtue of how our faculties of sensory perception and memory interact (or interface) in consort with the temporally designative function of "the now." Plotinus' views on the nature of human cognition (including perception and memory) may be similarly pertinent to his account of time and its authentic (entirely real) existence. The "now," however, is almost entirely absent from Plotinus' discussions in *On Eternity and Time*. Another discernible feature of natural existence seems more salient for Plotinus as demonstrative of our universe's temporality—of the dynamic character of its "becomingness."

In Plotinus' philosophy, Soul's part-by-part preter-temporal causative activity is guided, its contents determined, by Intellect. This manifests itself at the level of natural existence in the organic ("living") character of all natural existents and processes—including ones we would typically consider inorganic, indeed inanimate. Consequently, what is is not merely what is. What is also is what it is by virtue of what was (and no longer is), and is anticipatory of what will be (but is not yet).

In regards to Soul as such, however, further imagine the movie projector projecting whatever it happens to be projecting, not as due to its containing already-projected and yet-to-be-projected still frames to constitute an ersatz past and future for it (or, rather, "in" it), but as due instead to its containing or in another way being guided by a

providential, as it were, computer-like programing of sorts—minimally, if not one preestablishing in detail what contents will arise from the projector's inner mechanisms to constitute each frame as it is projected onto the screen, then at least one which endows the projector with sufficient formation rules for it heuristically to do this. In virtue of this "programming" (Intellect), however, what is within the natural universe effected by Soul (as in the cinematic world created on the movie-screen by the projector) comes to be from what was (what already has been) even as it passes into what will be (what is not yet).

Our ability to recognize this aspect of natural existence—most evidently in virtue of its organic character as it inherently manifests Intellect's atemporal guidance of Soul's "motion"—thus seems especially germane for Plotinus to explicating and warranting our concordant ability to discern the real temporality of our universe.

I am not proposing here, though, that Plotinus' conception of motion itself—whether natural or, as in Soul's case, preternatural—is in effect cinematographic in character. Such a conception seems more congruent, rather, with Eleaticism.

PART I

DIMENSIONS OF TIME'S ENIGMA

CHAPTER ONE

IS TIME REAL?

What is time? Perhaps nothing. Or, rather, perhaps time is nothing real but for example a mental construct, or family of mental constructs—a conceptual artifice for organizing our inner and outer lives and experiences, our social interactions and behaviors, and our world and environment in certain useful ways. Or, maybe what we think of as time is but a grand illusion somehow endemic to human experience, or to how we interpret our experience—a figment without substance, an aspect of awareness, a residue of experience with no echo, no counterpart in reality.

What is this? Time is not real? Why would anyone propose something so outrageous? What could be more pervasive, inescapable, evident than time? Accordingly, George Schlesinger, for instance, finds the very notion of time's unreality simply absurd, arguing:

> Everything happens in time; thus, if time is unreal it would be reasonable to infer that every physical particular is unreal too. But it is rather odd to declare the whole of reality as unreal. By the principle of vacuous contrast, if nothing is real, then being unreal no longer carries with it a very ominous connotation. [Schlesinger, 41]

The deficiencies in Schlesinger's reasoning here may be evident. Expanding its logic, however, renders them more explicit. Schlesinger in effect argues:

(1) Suppose that time is unreal.
(2) Now, everything [at least everything physical, everything in the physical world] that happens or exists happens or exists in time.
(3) Therefore, everything that happens or exists happens or exists in what is unreal.
(4) Something that happens or exists in what is unreal is itself unreal.
(5) Therefore, everything that happens or exists is unreal.
(6) Therefore, time has the same existential status as everything else. The supposition that time is unreal does not meaningfully contrast it with anything else, and so the supposition is meaningless.

The very notion that time is unreal, in other words, is self-defeating or -cancelling, as it were, so that any supposition, thesis, or hypothesis to the effect that time is unreal is just vacuous, without meaning or content.

Whatever (else) the notion of time's unreality means, it indeed surely intends to contrast time's existential status with that of things which are real. Schlesinger is also correct in positing that the notion intends to contrast time's existential status in particular with that of things, events, or other "real" features of the physical (or natural) world in which we live. Arguably, Schlesinger's conclusion in this rendering of his argument, accordingly, would indeed undermine an ascription of unreality to time.

But, whatever (else) the notion of time's unreality means, it surely intends as well to deny Schlesinger's claim in step (2) of this argument. Indeed, as we shall see, that physical or natural existence and processes are ("in reality") atemporal—that they do not exist or occur in time—is integral to the notion's meaning or intent. Schlesinger's step (2), in other words, just begs-the-question.

Additionally, though, step (4)—what Schlesinger terms 'the principle of vacuous contrast'—is hardly self-evident. That is, why someone who asserts or entertains the notion of time's unreality need accept the principle expressed in step (4) is not at all evident.

For instance, various philosophers (and scientists) have considered the notion of empty space, or of an absolute vacuum, meaningful and even important. Is empty space, or an absolute vacuum, real? This is a complex question. Various thinkers, though, have considered it plausible (or, at least a legitimate option) to maintain in effect that empty space, or an absolute vacuum, is a nothingness; and, further, that nothingness is surely unreal.

The most plausible answer to the question, therefore, is that empty space, or an absolute vacuum, is indeed unreal, inasmuch as it is not anything—or, is nothing—real. Consequently, if something happens or exists in otherwise empty space, or an absolute vacuum, it happens or exists in what is unreal; but, contrary to Schlesinger, this surely does not entail that what happens or exists in that existential environment is itself unreal.

This chapter focuses on two sorts of motivations why someone might question the reality of time. The first is the recalcitrant puzzle of what real existents, or real characteristics or features of real existents, our temporal concepts and predicates could actually denote. The second

is the seeming incoherence of certain ways in which we think about time.

Two major subtopics to explicating the first motivation are the suitability or congruence of our temporal concepts to what they putatively denote in the first place, and the (general) character and relevance to the question of time's reality of supposing in effect that time is real but it resides or comes from within us. The second motivation focuses on the especially central role which pastness (or, the past) and futurity (or, the future) play in our thinking about time.

In these terms, moreover, the notion of time's unreality can have at least two possible meanings. Someone who asserts or entertains time's unreality might intend, concordant with the first motivation, that our temporal concepts and predicates (including the general concept or predicate 'time' as such) do not denote anything real. That is, they do not denote any real existents or anything real pertaining to real existents. Alternatively, someone who asserts or entertains time's unreality (we shall see when I discuss the second motivation) might intend that we cannot coherently ascribe real existence to time—or, that is, that the converse notion to time's unreality (the notion that time is real) is incoherent.

This latter approach may seem akin to Schlesinger's, inasmuch as it alleges there to be fundamental conceptual difficulties pertaining to time and its relation to "realness." It does not, however, appeal to any such question-begging assertion as step (2) in the foregoing rendering of Schlesinger's argument. That is, it does not merely assert something which the notion of time's unreality intends to deny. It, moreover, purports the incoherence of the contrary notion to time's unreality—of positing instead that time is real. And, whereas Schlesinger seems not to recognize that his "principle of vacuous contrast" would equally imply that the contrary notion regarding time's reality (in his case, that time is real) is likewise meaningless, the conceptual incoherence approach to time's unreality embraces the implication that there is no meaningful way to distinguish a purportedly (physical, natural) temporal reality from an atemporal one.

This latter approach, accordingly, is less akin to Schlesinger's and (especially if we add that an incoherent concept cannot denote anything) more akin to a generalized variant of the first approach to time's unreality, *albeit* one based on a different sort of consideration or argumentation.

I introduce the first motivation for questioning time's reality with

an example: March 20, 2011, is a vernal equinox. At equinox (we commonly suppose), daytime and nighttime are (approximately) equal. Each lasts (approximately) twelve hours. For example, sunrise occurs at (approximately) 6 a.m. at my latitude, sunset at (approximately) 6 p.m. This surely describes how it is that March 20, 2011, is a vernal equinox. Or does it? Does this description in fact depict what actually happens at equinox?

What actually happens pertinent to this common conception of equinox is that Earth's continuously changing axial orientation and orbital relationship to our sun results in a certain continual illumination of a given terrestrial location by Sol's light and then a certain continual darkness, or absence of Sol's illuminance, at that location.

These two episodes do occur sequentially: The cessation of this span of daylight coincides with the onset of this darkness, just as its own onset coincided with the cessation of another span of darkness. Indeed, they are sequential precisely because they are not in fact two separate yet somehow related episodes. There rather exists only the one, single, continuous natural history of our universe wherein such daylight-darkness (or darkness-daylight) sequences repeatedly occur due to Earth's ongoing rotational and relational history with respect to Sol.

But, if this sort of account more perspicuously describes what actually happens at equinox, what is there for the previous account to be distinctly describing? Where is the *twelve hours* of this particular continual sunlight? Or the *twelve hours* of this particular darkness? And, where or what is this *6 a.m.* (this *time at which*) when sunrise occurs? Or this *6 p.m.* (this other *time-at-which*) when sunset occurs? Where is this *March 20* (this *day* and *date*) when this repetition of vernal equinox occurs? Or this *year* (indeed, this *year 2011*) of which this *March 20* is allegedly a part?

Significantly, moreover, the common conception of an equinox in terms of such notions and predicates as these in fact is simply incorrect. The distinctive characteristic most commonly associated with an equinox—the notion of its equal daytime and nighttime—is not merely approximate. It is misapplied. For one thing,

> on the day of the equinox the daylight time … is typically six to ten minutes longer than the nighttime. At latitudes near forty degrees this means that the dates when the daytime and the nighttime are both twelve hours are about four days away from the equinoxes; for example, about March 17 in the Northern Hemisphere and March 25 in the Southern Hemisphere for the vernal equinox. [Steel, 371].

Indeed, the actual occurrence of a vernal equinox is itself somewhat a moving target. The vernal equinox year—the time from one equinox to the next—is approximately 365.2424 days long. This, however, differs from the Gregorian calendar year, which assumes a 365.25 day solar year (hence, the Gregorian calendrical system of three 365-day years and one 366-day year each quadrennial). The discrepancy between the two amounts to approximately one hour every four hundred years—though this computation is itself further complicated by the fact that the vernal equinox year is itself changing, owing especially to Earth's slowing axial rotation and gravitational affects of its brethren planetary masses [Steel, 185, 192].

The notion that two successive vernal equinoxes occur approximately 365.2424 days apart indicates the further, equally fundamental fact that an equinox is not a day-long event in the first place. Owing to Earth's axial tilt, its orbital plane (or ecliptic) and its equatorial plane are angled approximately 23½ degrees with respect to one another. These two planes intersect at two opposite locations along Earth's orbital ellipse. The two locations are kinetically (roughly) midway between Earth's solar perihelion and solar aphelion. An autumnal equinox occurs when Sol is at the one such location which marks the beginning of its orbital descension with respect to Earth. A vernal equinox occurs when Sol is at the opposite location, which marks the beginning of its orbital ascension with respect to Earth. In 2011, the vernal equinox is slated to occur on March 20 at 23:21 Universal Time, or 6:38 US-EST [crh.noaa.gov site].

Alternatively, the equinoxes may also be defined in terms of Earth's orientation in relation to Sol, inasmuch as when Sol is at each of these two locations Earth's polar axis is perpendicular to its orbital plane. (Consequently, sunrise occurs from due East and sunset occurs to due West on days one occurs.) In the autumnal case this orientation marks the seasonal year's transition from Summer to Autumn; and in the vernal case it marks the seasonal year's transition from Winter to Spring.

In either case, though, the most perspicuous way to describe a vernal equinox requires only the language of relational locations, orientations, astrologic planes, and kinetic motions. The additional lesson of the equinox example—how disconnected our temporally framed conceptions can be from the reality of things—will, however, continually reemerge during this investigation.

Issues regarding the propriety, perspicacity, or congruence of our temporal concepts to what they putatively denote do not, however,

directly challenge the reality of time. For a couple analogous examples, consider the Ancient Greeks' belief in a legendary race of giants, and Medieval Europeans' belief in unicorns of yet another bygone era. Further, suppose that the former was indeed partly due to Ancient Greeks misidentifying elephant tibias as leg bones from very very large human-like beings; and that the latter was, similarly, partly inspired by adventurers' gifts of Narwal horns to their royal benefactors.

Neither giants nor unicorns as such exist. Nor have they ever existed (or, so it seems). But nor is it the case that the two concepts do not denote anything (real) at all. Arguably, previous discussion indicates that our common conception of equinox, and various related temporal notions, are somewhat akin to the Greek conception of pre-Olympian giants and the Medieval conception of magical-age unicorns, inasmuch as they may not denote what we commonly presume them to denote (or, inasmuch as what we commonly presume them to denote is unreal, does not in reality exist) and yet there is something real for them to denote, which they in fact do denote (for example, the misidentified elephant tibias, or the Medieval Narwal horns).

On the other hand, the cases seem disanalogous in a crucial respect: The equinox example illustrates an entire category or system of human concepts and predicates whose relationship to real existence is uncertain and under suspicion; whereas the giants and unicorns examples exemplify a certain subset (say, mythic creatures) of a larger category or system of concepts and predicates which includes other (related) concepts and predicates that do denote real existents—for instance, 'elephant tibias,' 'human beings,' 'Narwal horns,' and 'horses'.

Nor is the potentially troublesome implications of our temporal concepts' and predicates' seeming lack of congruence with, or disconnection from, what in reality exists a matter just of certain mundane or archaic ways of thinking. In fact, contemporary scientists stand alongside the most mundane of us in this regard. For a quick example, Davies asks, in explicating Relativity physicists' understanding of time:

> But whose time is the Bonn [terra standard] clock telling anyway? … Might there be another clock, perhaps on another planet somewhere, faithfully ticking out another time altogether, to the joy of its makers? [Davies, 22]

Here, time is so disconnected from reality that it has become indistinguishable just from purported time-keeping devices, or from certain conceptual means for "reading" such devices. These devices, of course,

are connected to (physical, natural) reality inasmuch as their operations and activities are themselves physical processes. But, so what? How does this relate them to time (if or insofar as time is in fact something real)? Indeed, our temporal concepts' and conceptions' disconnection from real existence is here elevated to doctrine.

For now, in any case, a concise way to characterize the primary puzzle introduced by the vernal equinox example is this: Arguably, the reality in which we live is populated by such things as human beings, their activities and behaviors; trees and planets, their natural motions and processes; perhaps also colors, shapes, and other such natural properties of the aforementioned human beings, trees, planets, and the like. As denizens of our universe, these things also interact and interrelate. However, our universe does not seem to be also populated by such items as hours and years, days and dates, times and spans of time, or same and different times. An inventory of our (the real) world's constituents seems complete without including such items. These sorts of items, however, constitute time. But, if time's constituents are unreal, then surely time also is not real.

This can be made somewhat more precise. In particular, the vernal equinox example touches on three sorts of concepts commonly associated with time—concepts pertaining to

(i) temporal extent (duration);
(ii) temporal location; and
(iii) temporal order.

For instance, *the day* as the span of time, say, from one onset of daylight to the next at a given location on Earth and *the hour* as a certain portion of the day pertain to duration. Arguably, time never just exists or passes. Rather, it exists or passes in specific or increasing amounts. The time between one onset of daylight and the next, for example, is not just time but a certain stretch of time. Temporal phenomena do not merely happen; rather, they always "last for" or "take" some determinate amount of time.

Whereas such concepts as *6 a.m.*, *6 p.m.*, and *March 20, 2011* pertain to temporal location. Temporal phenomena seem always to be temporally situated or positioned in reality, and in relation to one another. It is convenient to think of this in a manner analogous to how things in our universe seem always to be spatially situated or positioned. They always exist or occur some*where*. They exist or occur wherever—at whatever

places-where—they in fact exist or occur, and not somewhere else. By analogy, it seems reasonable to suppose, things always exist or occur some*when* as well. They exist or occur whenever—at whatever times-when—they in fact exist or occur, and not somewhen else. Thus, such temporal locator phrases as *at 6 a.m.* or *on March 20, 2011* are entirely proper sorts of responses to 'when?' questions, just as such spatial locator phrases as *at the galactic center* or *on Denali* are proper sorts of responses to 'where?' questions.

These examples also intimate temporal order. Associating such numerical concepts as *6* and *2011* with times-when suggests that the time-when denoted by '6 a.m.' or by '6 p.m.' or by 'the year 2011' is itself part of an ordered sequence of times-when—so that there is also a 5 a.m. and a 7 a.m., a 5 p.m. and a 7 p.m., a year 2010 and a year 2012, and so on.

In general, we commonly suppose that phenomena in our world exist or occur temporally *before* and *after* one another, *earlier* or *later* than one another. They temporally *precede* and *succeed* one another, or else they exist or occur synchronically (at the same time). We thus think as well, for instance, about *the day before yesterday* or *preceding generations* or *during the next full moon* or *after I graduate*.

In these terms, the vernal equinox case exemplifies a concern whether concepts and predicates of these three sorts in fact describe the real world, or denote any real constituents or features of it. Perhaps, though, this concern arises from mistaking the function and intent of such concepts. Perhaps, contrary to the earlier comparison of temporal concepts and predicates with Ancient giants and Medieval unicorns, using such temporal concepts is more akin, say, to talking about the dismal and gloomy weather, or about Mirabel's joyful and effervescent new dress. That is, while these latter cases are meant in a way to describe the weather or Mirabel's dress, labeling the weather 'dismal' and 'gloomy' or a dress 'joyful' and 'effervescent' is more metaphor than description.

But surely 'It has been raining for six hours' semantically differs markedly from 'It is gloomy outside', as would 'Mirabel purchased that dress yesterday' from 'Mirabel's new dress is radiantly effervescent'. Even so, just as we could reasonably ask where in addition to the rain and darkness is the weather's alleged gloominess, so too may we ask where in addition to this episode of rainfall is its alleged *lasting-for-six-hours*. Or, just as we could reasonably ask where in addition to this dress's particular assemblage of fabric and colors is its purported

radiant effervescence, so too may we ask where in addition to Mirabel's selecting and paying for this dress is the *yesterday* of her purchasing it—or the today, or date, of her wearing it.

I shall say more later about the semantics of descriptions employing temporal concepts or predicates. First, though, let us consider if there may be more to the above comparisons than their mutually dubious, or at least uncertain, descriptive function or intent.

The metaphorical character, for example, of ascribing gloominess to the weather is due to this concept's primary reference to a human emotional condition. Gloomy is primarily a certain way human beings inwardly feel. Using this concept as if it describes the weather in effect transposes or projects that mood onto the weather.

Similarly, perhaps we have been looking in the wrong place for the primary referents of our temporal concepts and predicates. Perhaps temporal durations and locations and orderings, for instance, indeed do not exist "out there," amid the real constituents of our universe. But perhaps (akin to gloominess) they exist "in us" instead, and we transpose or project them onto our surrounding physical environment. I shall term this supposition the *internalization* approach to time.

The internalization approach, however, has severe drawbacks. A big one is that it does not support our common presumption that time is real. To the contrary, it contradicts this presumption, and it is tantamount to denying time's reality instead.

The doctrine that time is unreal is termed *Eleaticism*. The internalization approach to time is compatible with Eleaticism. It in fact was introduced and, it seems, embraced by Eleaticism's founders in classical Greek philosophy. If the internalization approach is correct, then Eleaticism is correct: Time indeed is unreal.

Explicating the character and implications of Eleaticism in more detail will be a main (sub)topic in Chapter 2. For now, it is enough to emphasize the related point that, insofar as a proponent of the internalization approach responds that at least the approach allows time to exist (somehow "in us"), it thereby still renders time something very different from what-and-where we commonly presume it to be.

Another severe drawback to the internalization approach is that it just relocates the problem instead of resolving it, inasmuch as the same sorts of questions posed earlier concerning the denizens of our universe may be posed regarding the processes and phenomena constitutive of our "inner lives" of experience and awareness.

Adapting David Hume's infamous conceit regarding the Self: how-

ever much we search within ourselves for time or time-like existents, we shall always find ourselves aware only of some particular feeling or thought, some particular sensation or memory, or some conglomeration of several such phenomena. We shall never glimpse, for example, just *now* or *the present*; nor just some *temporal amount* or *temporal stretch*; nor just *before* or just *after*, much less some particular *time-before* or some particular *time-after*; nor somehow just *time-all-by-itself*. A list of the sorts of items we may encounter during such introspective sojourns will differ from an inventory of real existents "out there"; but the resulting conundrum regarding time's real existence is the same.

These "inner" phenomena include, of course, our thoughts and judgments employing temporal concepts. But, this observation merely repeats what we already know: That human beings indeed think about such matters and make these sorts of judgments. We equally, though, may encounter within ourselves thoughts concerning such things as elves and unicorns, perfect circles and infinite sets, future loves and heroic triumphs, insurmountable odds and unsurpassable enlightenment, chocolate raindrops and flannel stairways, pungent sunrises and purple harmonies. The occurrence (existence) of a mental act never entails the real existence of its subject (intentional object), of what it is *about*.

J.J. Gibson, for instance, takes an utterly cognitivist (or, intellectualist) approach, according to which time—or at least human temporal awareness (this is unclear)—is entirely a matter of certain ways in which we think about our experiences and their (intentional) objects:

> Time and space are intellectual achievements, not perceptual categories … [T]he mere passage of time, empty time, is not perceived. The fact is that our experience is never empty. A sequence of external stimuli or, at the very least, the rhythms of the observer's body, provide a flow of *change*, and it is this we perceive rather than a flow of time as such. [Gibson, 299]

To be sure, one might wonder why these "achievements" seem endemic to the normal course of every human's maturation and development. Still, the occurrence (existence) of a mental act or process—no matter how common and widespread—does not entail the existence of its subject (intentional object), of what it is *about*.

It is, of course, surely plausible to suppose that, insofar as time is real, activities which occur "in us" have their own temporal characteristics—for instance, their own temporal durations, locations, relations, and the like. This 'insofar as time is real,' however, just repeats the original

puzzle. Moreover, this observation does not locate time "in us"; rather, *it locates what is or occurs "in us" within time*—that is, within the temporal universe.

This supposition is also independent of the particular sort of mental act or process. It could be, for example, a meditative reverie seeking convergence with undifferentiated beingness, a pondering on the implications and intentions of theocratic politicians, a discursive demonstration of a metalogic theorem, a reminiscence of yesterday's rainstorm, a rumination over possible vacation destinations, or an ongoing visual awareness of Sol's illuminance. It need not be any sort of temporal judgment—any judgment relating a temporal concept to some phenomenon—at all. Accordingly, yet again, there is nothing special or privileged about our temporal thoughts and judgments in this regard either.

Time and time-like existents seem no more to be lurking somewhere in our psyches than they are found looming amid the furniture and decorations of nature. The fact that we do think about time and temporal things is irrelevant to our puzzle. And, locating time "in us" by maintaining that our inner lives are themselves temporal is most plausibly a corollary to a more general thesis concerning time's relation to our universe, and so to every real existent or activity within it. Most plausibly, in other words, our inner acts and processes have temporal characteristics because they exist and occur within a temporal universe.

But, even if this thesis could be sensically restricted to claiming that only our inner acts and processes have temporal characteristics—that time exists only with respect to our inner lives—its relevance even just to our common temporal concepts and thoughts is utterly opaque. Restricting the thesis in this way does not alter the fact, for example, that my thinking about Socrates (temporally) after thinking about Immanuel Kant does not entail that Socrates existed (temporally) later than Kant; nor, for another example, that when a sprinter experientially estimates and believes that she has run a 100-meter dash in under 10 seconds, the race official's stopwatch showing that she did not do so is the more likely to be correct. And, none of us would normally suppose otherwise.

An historical philosophical variation on the internalization theme states: Space is the measure of physical ("external") motion, whereas time is the measure of mental ("internal") motion. This slogan is often taken by philosophers to be profound yet innocuous. But it in fact is not innocuous, nor profound.

Arguably, this slogan rather is nonsensical unless accompanied by the controversial doctrine that physical existence and mental existence occupy or constitute two distinct realities, or modes of reality—a doctrine commonly known as *Cartesianism*. For, without some such doctrine, there is no rationale for even proposing that physical and mental "motions" are somehow fundamentally different in their existential characters.

Even then, however, the slogan's meaning is inscrutable. As labels for two distinct sets of activities which nevertheless occur in the single conjoint reality in which as physical-*cum*-mental beings we would then reside, why "physical" activities somehow would be spatial but not temporal while "mental" activities somehow are temporal but not spatial, would remain mysterious and inexplicable.

Indeed, the first conjunct of this slogan—that space (but not time) is the measure of physical activity—is already just false. To be sure, distance (spatial extent) is one measure of locomotion (motion with respect to space). More typically, though, when we think of measuring locomotion we describe it as a rate of motion expressible as a ratio of distance with respect to time (velocity), or else as a physical instantiation of that rate (speed). And there are many other sorts of physical activities which seem more properly related to time than to space in the first place—for example, Autumnal changes in leafs' colorations day-to-day, the observable stages of a supernova night-to-night, or the molding cheese in my refrigerator.

As for the second conjunct in this slogan—that time is the measure (only) of mental activity—two possible meanings are most plausible. Arguably, as in the case of Autumnal alterations of deciduous foliage, or the fuzzy-greening of my neglected Mozarella, mental activities do seem more properly and primarily related to time than to space as a mode of "measuring" them. This may, however, be the case because currently we are largely clueless how to relate a particular mental activity to a precise change or location with respect to space (for example, somewhere within one's cranial volume). This, however, is an epistemic matter—a question of knowledge—and perhaps, even presuming the requisite knowledge, practicality. It entails nothing concerning the reality or nature of time.

Alternatively, this second conjunct in the slogan may mean that, unlike (allegedly) space-measuring, time-measuring is entirely subjective. That is, it pertains just to, and is determined entirely by, the intentional contents of certain mental activities or judgments—in particular,

of time-measuring (or, more accurately, time-estimating) mental activities or judgments. This possible meaning of the slogan, however, likewise in fact entails nothing pertaining to the question of time's reality, unless as part of a denial (instead of a defense) of its reality.

As the example earlier of thinking about Socrates after thinking about Kant indicates, the internalization approach mainly just renders our temporal concepts, predicates, thoughts, and experiences themselves all the more enigmatic. For another example, consider a recent six-hour rainfall. The internalization approach implies that what occurred "out there" indeed was just a certain episode of rainfall entirely explicable in terms of the natural history of nature's processes and activities.

On a literal rendering of the internalization approach, someone's judgment that the rainfall lasted six hours would have to be a consequence, rather, of her awareness (of the rainfall) somehow having lasted six hours. At the very least, the internalization approach holds that her thoughts and judgments concerning the rainfall's temporality would somehow have to be due entirely to certain temporal characteristics of her awareness of the rainfall, and not due to the rainfall episode itself.

I sometimes have dream experiences wherein I feel in the midst of some life-drama several hours, even an entire day, in length. I would be extremely surprised, however, if in fact the dream itself lasted more than a small fraction as long. Neuropsychological sleep research agrees. But, in any case, I simply hadn't even slept for that long. I've even awakened out of such dreams disoriented, initially convinced that an entire morning or even day has passed, all because of the dream and its faux-temporal character and contents.

Even fully awake, though, people's knacks for judging time's passing vary widely and usually are notoriously inaccurate. The very suggestion that our six-hour-rainfall observer was aware of the rainfall for six hours is incredulous. And proposing, alternatively, that the duration of her awareness must at least correlate in some other systematic way with activities in her surrounding environment is a non-starter. If she had experienced, say, a one hour awareness of rainfall, then she therein experienced one hour(and not six hours) of rainfall.

That is, if this last proposal is something like that her experiencing something for an hour systematically correlates 1:6 with how long it in reality lasts, then either this abandons the internalization approach or it is nonsensical. And, if we additionally, or instead, suppose that

different observers' internal temporalities may systematically differ so that what to her was a one hour of rainfall might to me have been a six hour rainfall, then either there in fact exists a non-internalized time in virtue of which at least one of our respective internal time experiences (and related judgments) is in fact incorrect, or else the proposal is again nonsensical.

The weakest possible version of the internalization approach is just the notion that what we think of as time is a function of an internal time-sense of some sort. But even this is problematic. If the human psyche was "designed" for this function, it was designed very badly indeed. Many "inner" conditions and processes can affect our temporal awareness and judgment. An inebriated consciousness may perceive time more slowly, a caffeinated awareness more quickly. And, people estimate time differently when much is happening than when little is happening, when differing amounts of content and activity are occurring in their psychic or sensate environments. Nor is even just the direction that their estimations diverge consistent. Sometimes more activities or events instead yield a sense of quicker (shorter) time-passage, even while other times more activities or events subjectively seem to stretch (lengthen) time's passage.

Most significantly, though, the notion of an internal time sense provides neither sense nor support to the internalization approach. If anything, it dooms it instead.

Intoxicants and caffeine are physical substances; and the primary means by which our awareness is supplied content daily is our perceptual, sensorial interactions with our (physical) environment. Indeed, our purported inner time-sense may vary, for example, even in virtue of one's biological gender (Michon, 251), or body temperature (Rifkin, 40). Michon thus elaborates, regarding the related notion of an *internal clock*:

> This is a hypothetical mechanism which is driven by the state of specific activation of the subject. When the level of specific activation is high the clock rate will be fast, and when the level is low the rate will slow down … *[E]xternal stimuli* will influence the state of specific activation … On the other hand body temperature, emotional states, and drugs are known to alter the state of arousal, and consequently are thought of as changing the rate of the [hypothetical] internal clock. [Michon, 245]

Insofar as we do possess some such thing as an internal time-sense (or perhaps even an "inner clock" of some sort)—though this is highly debatable—it is most plausibly an artifact of various of our bodily rhythms or "clocks," at least some of which seem

> entrained to work in precise coordination with the rhythms of *the external physical world*. Living things time their internal and external functions with the solar day, the lunar month, the seasons, and the annual rotation of the earth around the sun. [Rifkin, 31]

Even then, however, how an inner time-sense might account for many of our actual temporal assessments remains mysterious.

No reasonable actual rainfall observer would judge that it has rained for six hours without, for example, consulting a device she presumes "keeps track" somehow of time's passage—and to do so with respect to what's going on "out there," in her surrounding physical environment. She would likely also presume that the device equally keeps track of how time elapses for her (or, "in" her); but this additional presumption as no direct bearing on the rainfall's own temporal duration. Rather, it highlights the point that our "inner" processes and states are themselves temporal only because and insofar as they transpire or exist in a temporal universe.

The weakest (and most plausible) sort of internal time-sense attributable to us would be an entirely general, indeterminate awareness just of time's occurring or passing. But, what would this purported time-sense be if not just our awareness itself or, perhaps more precisely, a reflective awareness of being aware in various ways of various things? Here again, though, the notion of a (reflective) sense of some sort of time-sensing tempo or rhythm to our perceptions and thoughts and emotions (and so forth), or to their contents (or intentional objects) is most plausibly explicated as a matter of they themselves existing or occurring within a temporal universe.

Arguably, there indeed is no tempo which is not some specific, determinate tempo. As already observed, however, the most likely plausible source of this or that specific "inner" tempo would be our environment (and not our awareness itself). This external (to awareness as such) environment includes our own bodies—and so, for instance, our aforementioned network of bodily or physiologic "clocks" would likely be an especially prime source of any tempos or rhythms reflectively discernible in our inner life of thought and awareness as such.

The wider world—the "external" physical environment—in which we bodily live, however, can also demonstrably entrain our inward selves. The notion of *entrainment* refers to "the process by which one internal (or endogenous) rhythmic process is captured and modified by another (endogenous or exogenous) rhythmic process" [Kelly, 89].

Jeremy Rifkin explicates an instructive chronopsychological example,

regarding how computer video games can affect enthusiasts' sense of temporal reality:

> The really good video game players are able to block out both clock time and their own subjective time and descend completely into the time world of the game. It is a common experience for video game junkies to spend hours on end in front of the console without any sense whatsoever of the passage of clock time. [Rifkin, 16]

And he quotes Craig Brod, a psychologist specializing in computer-related anxiety and distress, that "those who live with computer workers invariably complain that disputes over time are a major source of friction" [Rifkin, 16; Brod, 115–116].

Moreover, affects of these psychological excursions into digital reality can extend well beyond the gaming experiences themselves:

> When children interface primarily with the computer, sequences, durations, and rhythms speed by, requiring a level of sustained mental concentration that far exceeds what children normally experience when they are learning time skills in conventional settings. The child becomes entrained to the time orientation of his artificial companion, rather than to the more organic time orientation of other children and teachers. [Rifkin, 24]

Accordingly, even just the highly general internalizationist notion that our temporal assessments pertain to the world around us, as it were, only from the inside outwards is wrong-headed. It is akin to claiming that, since a barometer's assessments of environmental barometric pressure involve certain "internal" processes of the barometer, its "assessments" pertain to its environment only because of a special barometric-pressure-making ability inherent to those processes.

It is undeniable, in any case, that any inner time or time-sense we may possess depends upon, or at least is centrally shaped and influenced by, various of our physiologic, neurologic, and biochemical processes. The processes most amenable to study in turn are dependent on, or at least are significantly affected by, our wider natural environment. In this respect, too, any inner clock(s) or other sorts of inward temporality we may possess require a prior "external" temporal reality attributable to the world in which we live.

One class of these processes is termed *circadian*: They proceed cyclically (recurrently) in train with the solar day. Actually, though, this common way of characterizing these processes is an oversimplification. The mechanisms underlying our wake-sleep cycles provide a good example. We may even call this particular circadian pattern our "master clock."

Winfree indicates, concerning this clock's native operation and relation to the solar day:

> A discrepancy of an hour or so one way or the other is usual among the many species whose internal clocks have been timed with care. The human body clock, for example, has a period close to 25 hours. [Winfree, 8]

And yet, we humans commonly do (*albeit* some more successfully than others) sleep and awaken (sometime even without a wake-alarm) relative to the 24 hour solar day.

Arguably, something must be responsible for our master clock departing from its own native tendencies, and entraining to nature's Terra-Sol clock instead:

> To maintain synchrony between our internal clock and the earth's rotation requires more than a close match between the two periods: it requires some cue, a cadence caller by which our clocks may be reset daily to agree with local time where we live. [Winfree, 9]

The primary cue and stimulus is most likely daylight (natural illumination). Winfree explains that

> most species' internal clocks do indeed react more sensitively to light as a timing cue than to anything else. Continuous illumination at the intensity of moonlight, in fact, is enough to arrest the progress of the circadian cycle in fruit flies and fungi in my laboratory … [F]or almost all species tested, watching for light is the best way to learn what time it is. [Winfree, 9]

Winfree also describes experiments in which human subjects are isolated from any exposure to external daylight and darkness for thirty days: "A typical subject will continue his or her body temperature rhythm and sleep/wake alteration as before, but they will drift later by about an hour a day" [Winfree, p. 23].

Further, when isolated for longer and longer durations, people increasingly undergo and experience irregularities and breakdowns among various "timed" processes (including sleep and waking). Natural illumination, along with its diurnal dance with natural darkness, is thus centrally important if various rhythmic bodily processes are to function properly at all.

The internalization approach to time is sometimes accompanied with an internalization account of the objects of human awareness (including our sensory awareness). For example, the rainfall someone observes is thought to be itself a phenomena which occurs "in us" (the observer). This observed rainfall's connection with a real rainfall and

with actual things made actually wet is at best indirect, on this addendum to the approach, mediated by however it is that the (real) universe (if there is one) connects (if at all) with our sensory and mental processes. Our own bodies and bodily processes, Sol and Earth, light and dark, and so forth, as we and scientists observe them and experiment and collect data concerning them, are themselves thus construed to be nothing outside our inner world of sensation and thought.

This additional complexity, however, does not help. For instance, it does not alter the point that the internalization approach in fact supports the Eleatic thesis that time is unreal, nor the point that it relocates rather than resolves our inability to locate any temporal or time-like existents *at all*, or *anywhere*.

In any case, many of the things we think or say about temporal phenomena surely seem warranted, at times even accurate; and they seem so with respect to real denizens and constituents of our (real) universe. When we say 'The rain lasted six hours', for example, we presume that real things really got wet during a six-hour time period.

A common term for warranted, accurate, correct, or the like, judgments or statements—let us just say *assertions*—is *true* and, for those which are not, *false*. Let us also call assertions meant to pertain to real existents and phenomena in our universe *factual* assertions. Earlier I characterized the typical function of such assertions to be descriptive. That is, we usually intend that their predicates describe something (in the world around us).

What does it mean to say that a factual assertion is true, or else false? A common philosophical approach to the semantics of factual assertions explicates them as descriptive or attributive predications: To assert '*x* is *F*' is to attribute whatever '*F*' (the predicate) denotes to whatever '*x*' (the subject) denotes. Accordingly, a factual assertion of the form '*x* is *F*' can be true or false, it must be the case that '*x*' and '*F*' each denote something. For, if one (or both) fail to denote anything, it fails even to be a factual assertion.

In these terms, one who challenges the reality of time questions whether our temporal predicates denote anything real. If they do not, then—whatever the function of assertions utilizing those predicates may be—they are (contrary to our usual presumption) not factual (or factually descriptive) assertions.

One contemporary philosophical response to this way of expressing the challenge to time's reality unabashedly attempts just to turn it inside out. This approach in effect begins with the fact that we do intend

various of our temporal assertions to be factual assertions, and infers that therefore their temporal predicates do denote something real.

It is somewhat commonplace among philosophers to use the term *properties* for existents which are presumptively real just because they are denoted by predicates of purported factual assertions. On this approach, then, the time-like existents purportedly denoted by temporal predicates are real inasmuch as they are properties of real existents.

How this conceit might resolve our puzzle, however, is opaque. The notion of properties is useful in certain technical philosophical contexts. But it is generally unenlightening and vacuous otherwise. To say, for example, that at equinox daylight lasts for twelve hours because equinoxal daylight has the property of lasting-for-twelve-hours (or of lasting-for-the-duration we denote as 'twelve hours') or that the concert starts at 8:00 p.m. because the concert has the property of starting-at-8:00 p.m. (or of starting-at-the-time we denote as '8:00 p.m.') does not tell us anything we do not already know—that we indeed do assert such things as 'At equinox daylight lasts for twelve hours' or 'The concert starts at 8:00 p.m.', and we commonly presume in so doing that such assertions are factual assertions. Regarding the issue of time's reality, then, this approach transparently just begs-the-question.

The very notion that time-like existents are certain distinct thingies known as (temporal) properties, which somehow adhere to real things and phenomena, is bizarre in any case. Suggesting that when daylight lasts for twelve hours it thereby has a certain lasting-twelve-hours property and it lasts for twelve hours because it has that property, or that when a concert starts at 8:00 p.m. it thereby has a certain starting-at-8:00 p.m. property and it starts at the time it starts because it has that property, explains nothing.

I myself occasionally use the term 'properties'. I have, for example, already mentioned 'colors and shapes and other such (natural) properties'. However, I do not presume to be saying anything more than, for instance, 'Let us presume for now that natural things do have colors and shapes and the like'. I especially do not presume to be saying or implying anything about what colors and shapes in reality are (if they are anything at all), or what it is about natural things (if anything at all) that our color-predicates and shape-predicates in fact denote. To say, for instance, that something has the property of being red or the property of being round says nothing more than that it is (putatively) red or (putatively) round, or that we commonly (or at least at times) presume to use these predicates factually.

This brings us to the second motivation mentioned at the outset of this chapter for questioning time's reality. This motivation derives from the paradoxical, even incoherent, character of certain ways in which we think about the reality of time. I shall focus here on the past and the future, or past existents and future existents, as illustrative of this motivation.

One promising approach to the problematic reality of time diverts attention, at least initially, from my preoccupation until now with specific temporal concepts or predicates towards a more general question: Is there something about our supposed temporal universe which distinguishes it from a universe which is just like it except for not being a temporal universe?

One excellent candidate avers: If our universe were not a temporal universe, it would not have a past and nor a future. There in fact would be no past, and no future. Or, our reality would in no way include past existents, nor future existents.

But, how could reality have or include a past? How could it have or include a future? The past is what was or has been. Past existents did exist or had existed. They were or had been real existents. But they no longer exist. They are no longer real existents.

Arguably, it makes no sense to say that the past exists, or it has real existence—that what did exist or had existed exists, that what was or had been real is real. What no longer exists does not exist, or have real existence.

Likewise, the future is what will be. Future existents will exist. They will be real existents. They are not yet real existents. Arguably, it likewise makes no sense to say that the future exists, or has real existence—that what will exist exists, that what will be real is real. What does not yet exist does not exist, or have real existence.

The past is no longer. The future is not yet. This is fundamental to our thinking about the past, and about the future. Perhaps, though, we could say that the past's reality, or the real existence of past existents, is in the past. But how does this say anything different from what has already been said—that the past, or past existents, no longer exist and therefore do not exist? Likewise, if we say that the future's reality, or the real existence of future existents, lies in the future, this also just repeats what has already been said—that the future, or future existents, do not yet exist and therefore do not exist.

Supposing that reality has or includes a past and a future seems to imply that, in that respect at least, reality is not real. Moreover, this

conundrum seems to pertain to the past as much as to the future. One might concede what has been said about the future, though, but insist that the past is a different sort of case.

One might, that is, allow that there is something amiss in supposing that the future is real and yet presume that the reality of the past is unproblematic. But, while there may be more reason(s) to question the reality of the future, the reality of the past and of the future—of past existents and of future existents—are in fact equally problematic. There is as much a question "where" the past could be lurking in reality as there is in regards to the future.

We say such things as 'Don't worry about the past. It's gone, done, finished, over.' Or, 'The past is past. Let it go.' Or even, 'The past exists only in our memories, photographs, and historical records.' Some past existents, of course, do still in reality exist as well—as I am writing this, for example, my computer, a photograph of my dad, Earth. But the others—the one's which are simply, utterly past—have, as the dinosaurs, all decayed or in other ways ceased to exist. They have dropped off the list of real existents.

Among the things which do have real existence are also various traces and evidentiary items which render the past epistemically accessible to us. In this regard, however, what has real existence is not the past but the memories and traces and records (and the like) evidence which provide us epistemic access to the past. When we talk about someone 'living in the past,' accordingly, we do not intend any sort of actual living but intend a cognitive or emotional disorder or malady—or, in extreme cases, a delusional dysfunction.

Yet, we also say such things as 'You can't change the past. It is what it is, and always will be.' We sometimes, in other words, think of the past as a sort of irrevocable and permanent fixture in reality, never lost or supplanted but continually added to. This perspective, though, is explicable in terms of the fact that past-tensed assertions do seem more akin in certain respects to present-tensed assertions than to future-tensed ones.

For example, certain assertions about the past are true, while others are false; and it is beyond our capabilities to change which ones are true and which ones false. Similarly, present-tensed factual assertions are true or false depending on what is or is not in reality the case; and it is beyond our capabilities to change which ones are true and which ones false insofar as their truth or falsity is thus determined.

Why past-tensed assertions resemble present-tensed ones in at least this one respect, however, is distinctive. It is beyond our capabilities to affect the truth or falsity of past-tensed assertions precisely because what would have determined the truth or falsity of a present-tensed variant of that assertion when it would have been propitious to make the assertion no longer exists. Past existents are not fixed and immutable denizens of reality. They are no longer denizens of reality at all; and we cannot change what is not around anymore. Whereas, the future is, as it were, yet to be written. We ourselves may in fact still contribute to its story. Consequently, we think of future-tensed assertions differently from both past-tensed and present-tensed assertions.

Maybe, though, past existents are not around anymore precisely just in that they are not around now. Yet, properly understood, they are still around. They are still around in the past. Accordingly, the imagery intimated in asking "where" in reality past existents are, or have gone, is misguided. It is not a matter of "where" they might have real existence but of when they have real existence. They (still) have real existence precisely when they had it in the first place.

Maybe, then, Socrates, the dinosaurs, and my first toothache no longer have real existence precisely because the "when" of their real existence is past. Indeed, perhaps it is more precisely in this respect that our own temporal universe differs from a non-temporal one: In our reality, real existents exist precisely when they in reality exist and not any other time—most especially, not at any time when they in reality do not exist.

But, this once again just parses differently the very notions which previous discussion suggests are paradoxical, even incoherent. One might respond to this gambit by asking: Why, then, 'the past' and 'past existents'? Likewise: Why 'the future' and 'future existents'? Every "when" is indeed precisely just the when it is and not any other when; and so nor is it anywhen else than (the) when it is.

The current supposition, though, is not that our universe is temporal because its reality involves a (sequential) plurality of whens, times, or times-when. The supposition, rather, is that it is temporal because it has or includes a past and past existents, and also a future and future existents.

But, why call certain whens 'past' if not because they no longer exist? And why call certain others 'future' if not because they do not yet exist? Likewise, why call certain existents 'past existents' if not because they

no longer (hence, do not) in reality exist? And why call certain others 'future existents' if not because they do not yet (hence, do not) in reality exist?

Again: The past is no longer. The future is not yet. Neither is. Insofar as reality has or consists in a past and future, it too is not.

CHAPTER TWO

ELEATICISM, TEMPORALITY, AND TIME

I have articulated two general motivations why someone might question the reality of time. The first frets over the apparent absence of any identifiably time-like existents among the denizens, constituents, and phenomena in our universe. The second is the seeming incoherence of certain ways in which we think about time—for example, so that its reality includes, or even consists of, unreality.

This chapter examines further the suggestion that we ask, not 'what could our temporal concepts, or predicates, in reality denote?', but 'what renders our universe a temporal universe (rather than an atemporal one)?' This suggestion accords especially well with an approach to time's reality which alleges, in effect, that both of the motivations articulated in Chapter 1 for denying time's reality confuse time and temporality.

Roughly, according to this defense, *time* connotes the fact that ours is a temporal universe. Establishing time's reality requires that there be something about our universe sufficient to warrant declaring that it is not an atemporal universe. Whereas, *temporality* encompasses the many distinctive and particular ways in which we think about temporal existence (for example, in ways pertaining to the three sorts of temporal concepts introduced in Chapter 1), and perhaps certain of the more general ways in which we commonly think about it (for example, as introduced in Chapter 1 as well, pertaining to past and future).

The approach alleges further that our discussion of time has thus far focused instead on temporality; but, temporality may have little (if anything) to do with time. Temporality, accordingly, may indeed be unreal. It may indeed be akin to an illusion, a delusion, or otherwise derive from certain peculiarities of human thought and awareness, or from certain pragmatic needs or other psycho-social conditions, disconnected from our surrounding "outer" environment as such. However, the approach continues, this need not impugn the reality of time.

Our universe is real. It also is a temporal universe. Therefore, time is real. But, whether its temporal reality conforms to ways we think

about, perhaps even experience, time—that is, to time as temporality—is immaterial.

The distinction between time and temporality may, however, extend to certain particular concepts and also to certain more general temporal notions as well. An example is the conundrum introduced with Chapter 1 regarding past and future. Someone may argue, that is, that the past is in fact real. Its reality consists in whatever has real existence when we make a (true) past-tensed assertion. Whereas its temporality (for example, that it consists of what was or has been but no longer is) may indeed be paradoxical, because unreal. Likewise, someone may argue, the future also is real. Its reality consists in whatever has real existence when we make a (true) future-tensed assertion. Whereas its temporality (for example, that it consists of what will be but is not yet) may indeed be paradoxical, because unreal. In sum, then, the past (as a constituent or feature of time) may be real even if its pastness (as a constituent or feature of temporality) is not; and, likewise, the future may be real even if its futurity is not.

An immediate difficulty for this approach is its "Huh?" factor. Arguably, time without temporality, whatever it might be, is not time. Likewise, for instance, without pastness the past is not the past; and without futurity the future is not the future. Consequently, whatever this approach's proponents might have in mind for 'past' and 'future' to denote, they do not denote constituents or features of time.

A chief proponent of time's distinctness from temporality is Twentieth Century scientific Eleaticism, especially physics as based in General Relativity Theory. This strain of Eleaticism differs from traditional philosophical Eleaticism in purporting to elucidate the reality of time instead of denying it. It presumes that ours is a temporal universe, and searches for something about it to warrant this presumption.

Accordingly, this chapter will, more specifically, examine contemporary scientific Eleaticism's pretense to account for the reality of time, especially as it attempts to designate a physical counterpart or manifestation of the so-called "arrow of time"—roughly, the notion that time is uni-directional and irreversible. This notion will itself be clarified by examining also the distinction between linear time and cyclical time. Finally, this chapter will explain further the contrast just alleged between (contemporary) scientific Eleaticism and traditional (philosophical) Eleaticism, and in so doing also the crucial distinction between static and dynamic approaches to time.

Contemporary scientific Eleaticism replaces temporality with a fourth dimension to natural existence (a dimension being a certain manner in which natural existents extend, or have extension); and it proclaims this dimension to be time, to be natural existence's temporal dimension.

We typically think of natural existents extending in three (spatial) dimensions. In everyday terms, a natural existent has height, width, and depth. The thesis that time is a fourth dimension purports that there exists, in addition to these spatial dimensions, a fourth manner in which natural existents extend; and it declares that this dimension just is time.

Even for general discussion purposes, though, this crude gloss requires a clarification. Scientific Eleaticism does not merely add an additional dimension to three-dimensional space. Rather, it replaces the two notions, space and time, with the single notion *space-time*.

In other words, natural existents are not spatial existents which are also temporal. They are spatio-temporal existents. They do not extend spatially and also temporally. They extend spatio-temporally. They do not occupy space, and also time. They instead occupy space-time.

In a way, the space-time approach renders time's reality more secure. For, as an aspect of the single reality of space-time, its reality would seem as secure as the less controversial reality of space-time's putative spatial dimensions. Indeed, this approach maintains that, insofar as the entirety of space is entirely real, so too is the totality of time.

The space-time approach, accordingly, is sometimes characterized as implicitly propounding a space-like conception of time, wherein

> the moments of all time are not intrinsically different (except numerically), but only distant from one another … In whatever sense any event or moment exists, so do all the others of the earlier and later history of the universe. [Christensen, 87–88]

Christensen is clear, moreover, about the implications for temporality:

> Hearing this claim for the first time, speakers of ordinary language instinctively ask, "Does this mean they're all occurring *now*?" But since the tense-adverb 'now' is illegitimate in the tenseless language of the [space-like time] theory, the question is ill-formed. Ordinary use of a phrase like 'occurring now' implies a contrast to having existed and being going to exist, which the [space-like time] theory denies. What it affirms instead is this: In whatever sense an event commonsensically said to "exist now" really does exist, so do all those other events. [Christensen, 87]

An immediate question, though, is: Why call this fourth dimension (of the single postulate, space-time) *time*, or reality's *temporal* dimension? What warrants this designation? How does reconfiguring natural existence to have a fourth dimension (or, to be four-dimensional) account for, explicate, or secure the reality of time? Why not just say that space itself is in reality four dimensional? Or, why not just call this fourth dimension something else entirely? Why not call it, for example, 'bob' and posit that natural existents have height, width, depth, and also bobness?

Einstein's colleague Hermann Weyl is a rare example of caution regarding this newly posited fourth-dimension's relation to time. He wrote in 1949 that, according to physic's new understanding of natural existence, "the objective world … is a four-dimensional continuum, *which is neither 'time' nor 'space*'" [quoted in Davies, p. 73 (my emphasis)]. In contrast, an exemplar of the dominant contemporary scientific rhetoric regarding time is Stephen Hawking, beginning in his ill-titled *A Brief History of Time*. More recently, Hawking writes cavalierly: "General relativity combines the time dimension with the three dimensions of space to form what is called spacetime … [so that] time and space do not exist independently of the universe or of each other" [Hawking, *Nutshell*, 35].

Contemporary scientific Eleatics in a way do, however, implicitly try to address this concern. In particular, they do typically want at least for there to be something sufficiently time-like about our universe to warrant their continuing to talk as if it were a temporal universe. They, more precisely, want for there to be something distinctive about their fourth dimension which distinguishes it from the three purported spatial dimensions, and in a way which warrants designating it to be reality's *temporal* dimension.

A popular choice here is this fourth-dimension's alleged asymmetry. Reality's three spatial dimensions are symmetric, it is claimed, whereas its temporal dimension is not. Or, natural existence is reversible with respect to space but not with respect to time.

However, space clearly is not symmetric in every respect. For example, for any given observer right is different from left, up is different from down, and farther-away is different from nearer-to—just as much as temporally-ahead is different from temporally-behind and temporally farther-away is different from temporally nearer-to.

Indeed, the space-time approach itself maintains that in fact time is just as symmetric as space insofar as any given location or portion of

the temporal dimension is as real and as much just time—as much just some location or portion of the temporal dimension—as every other one. Wherever we go, in whatever direction we proceed with respect to the three spatial dimensions we find just more space (or spatial extending-ness). But so, too, wherever (or, whenever) we go, in whatever direction we proceed, with respect to the temporal dimension we find just more time.

On the space-time approach, in other words, time is ontically homogeneous. Moreover, any given temporal location, or any given portion of space-time's temporal dimension, in fact is as such indiscernible from every other one.

But the space-time approach does not propound that time is asymmetric in every respect. The typical claim, rather, is that time (unlike space) is asymmetric in the more specific sense of *irreversible*. Whereas something can in principle proceed any direction with respect to space, it is typically claimed, it cannot do so with respect to time.

What goes up can come down; and it could have gone down instead of up in the first place. Whereas what proceeds temporally forwards cannot then proceed temporally backwards; nor could it have proceeded temporally backwards in the first place. Astronauts can travel to the moon, for example, and return whence they left Earth. But they cannot reach the moon tomorrow and arrive back yesterday, nor leave today and reach the moon last Monday.

A difficulty, though, is that this appeal to common experience in fact does not treat the dimensions equivalently. It (re)separates them, and it enhances time—it reimbues space-time's faux-temporal dimension—with some needed old-fashioned temporality.

To be sure, insofar as 'forwards in time' designates just the manner in which something proceeds with respect to time, time is surely irreversible. A natural existent cannot undo what it has already proceeded to do. It can only move forwards with respect to time. It can proceed only in the manner it proceeds, and not in some other manner. In this sense, however, space is equally irreversible.

A natural existent also does not proceed spatially in any manner other than the manner it in fact proceeds. Insofar as 'forwards in space' comparably designates the manner in which something proceeds with respect to space, it is equally true that nothing can proceed backwards with respect to space.

One response attempts to shift focus from space-time itself to some presumed human observer. Indeed, this gambit is commonplace in

physicists' expositions of their views on time. It is commonplace, beginning with Einstein himself, for scientific Eleatics to use examples and descriptions awash in temporality to illustrate and explicate components or implications of a theory, one of whose distinctive features is its rejection of temporality altogether. They point out, for example, that we can (and sometimes do) observe a natural existent proceed somewhere spatially and then proceed back whence it came; whereas we shall never observe a natural existent proceed somewhere (or, "somewhen") temporally and then proceed back whence (temporally) it came.

A major flaw with this response is that human observers are not situated somehow outside natural existence, so as to gaze upon it and neutrally observe the behaviors and activities of its denizens and constituents. Nor are actual human observers, insofar as they are existentially embedded in space-time, uniquely subject only to temporality but somehow not also to spatiality. An observer cannot observe space "from the outside," accordingly, so that she may identify a certain spatial location as just the same location whence something first moved and whither it then returned.

To say that something moves from a certain spatial location to another, and then returns to the former location, can only mean something to the effect that when the object moves this second time it proceeds to a location which to some observer seems sufficiently similar to the location whence it first left for her to characterize it in this commonplace manner—as being "the same place."

On the space-time approach, however, there is in principle no reason why a comparable perspective could not apply to time. Insofar as doing so would seem incredulous, this would be due to supposing that we are talking about temporality. We are not talking about temporality, however, but about one of the four dimensions of the single reality of space-time.

If, in other words, the claim is that whenever someone observes something move time will always elapse for her, then the same may be said regarding space. As an observer watches something move, space "elapses" as much as time. Natural existents "take space" to move as much as they take time.

More fundamentally, though, the space-time approach in fact does not claim that natural existents proceed spatially, and also temporally, in the first place. They instead proceed spatio-temporally. Natural existents do not have spatial locations, and also temporal locations. They

instead have spatio-temporal locations; and (though ontically homogeneous) every space-time location differs (with respect to a given coordinate system) from every other one.

Nothing can return to its previous spatial location any more than it can return to its previous temporal location, inasmuch as everything irrevocably proceeds from one space-time location to another space-time location. Insofar as natural existence does proceed irreversibly, it does so neither with respect to space nor with respect to time but only with respect to space-time.

In any case, as stated above, the space-time conception maintains that every location or portion of space-time's fourth dimension is equally and as entirely real as every other one. Time is in reality not something which "elapses" or "passes" anyway. Physicists' hypothetical detached and ontically neutral space-time observer is delusional in that regard.

From contemporary science's perspective, human observers are themselves natural existents (denizens of space-time). Our temporality-based conception of time as something (always) elapsing or passing is just false; and (contrary to what the internalization approach seeks to accomplish) it is as much simply false for our own experiential and cognitive processes as it is for the rest of natural existence.

Scientific Eleaticism is thus committed to the view that time in the sense of temporality is akin to an illusion or a delusion—or, minimally, that it is an inexplicable mystery which seemingly contradicts the reality of all things, including of sentient human beings. The space-time universe is thus also called the *block universe* precisely because of the imagery this evokes. Nothing actually moves or does anything in a block of wood or of stone (as we commonly think of such matters). Its constituents are (all) just there; and, in the space-time universe, this conceit extends to all four of its dimensions.

Still, irreversibility does seem a characteristic of time. The supposition that nothing can proceed backwards in time seems evident to most people. What's past is past and what's future is future, and natural existence seems irrevocably future-directed. What's future can and perhaps inevitably will become past, though it is then no longer future but past; whereas what's past can never become future at all. If something is temporally prior to something else and temporally subsequent to yet another, it is irrevocably prior to the former and subsequent to the latter. It can never be temporally subsequent to the former nor temporally prior to the latter.

As I write this, for example, what occurred in 1000 CE is in the past and what will occur in 3000 CE is in the future; and as I continue writing I continuously come temporally closer to 3000 CE and temporally farther from 1000 CE. I shall never be temporally closer to 1000 CE and temporally farther from 3000 CE instead.

Or, for another example, the first President of the United States lived before me and the one-hundredth President of the United States shall live after me. Consequently, I could never live before the first President of the United States nor after the one-hundredth President of the United States.

Special Relativity, though, may seem to deny that temporal ordering's irreversibility (directional asymmetry) is absolute. Morris notes:

> If we have two spatially separated events that we call A and B, some observers may conclude that A happened first, while others will insist that it was B that preceded A. In such a case, it is even possible for an event to take place in the "past" of one observer and in the "future" of another. [Morris, 157]

But, Morris also cautions against hasty interpretation of this feature of Special Relativity. Causal relations, for example, remain unimpugned:

> No observer, in any state of motion, will ever see a nail being driven into a piece of wood before it was struck by a hammer. Nor will any observer see a basketball fall through a hoop before it was thrown by a player. Finally, every observer will agree that the light from distant stars falls onto the surface of the earth long after it was emitted. [Morris, 157]

Insofar as causal orderings relate to time, accordingly, time is still irreversible with respect to any observer (or, more precisely, with respect to any given inertial frame). Also, the surprising phenomenon Morris has noted applies only to the special circumstance where

> the two events are distant enough from one another that no signal traveling at the speed of light could possibly get from one to the other before the latter happened. [Morris, 157]

The issue Morris raises here, then, pertains to Special Relativity's distinctive conception of time, especially the sense in which it relates time to the cosmic speed limit (of light) and to observers (inertial frames). This will be addressed further in Chapter 3.2.

In any case, suppose that natural existence is indeed irreversible and that, despite the unity of space-time, this irreversibility is due specifically just to its fourth dimension (despite this in fact not being the case). Suppose as well, then, that therefore this fourth dimension has

the time-like characteristic of irreversibility. Does this warrant equating it with time (or *vice versa*)? Arguably, the answer to this question depends, at least partly, on what it is about space-time's fourth dimension that purportedly renders it irreversible.

A popular way to explicate nature's purported asymmetry and irreversibility in a manner alleged to pertain specifically to its fourth dimension appeals to the Second Law of Thermodynamics (a.k.a. the Law of Entropy). Coveney and Highfield explain:

> The flow of time becomes apparent because there is an inexorable tendency in any system left to its own devices for organisation to diminish and randomness to increase … [Hence, t]he arrow of time is made explicit in the so-called *Second Law of Thermodynamics*, which states that all physical processes are irreversible because some energy is always dissipated as heat. [Coveney & Highfield, 147–148]

Christensen expresses the recondite notion this way:

> There is one highly general sort of irreversible process … that is most often proposed as supplying time's asymmetry, namely, the kind that involves increase of entropy … [C]rudely speaking, entropy is a measure of the disorder of a system of objects: the higher the entropy, the more disordered it is. Now it is a well-established principle of modern science, the Second Law of Thermodynamics, that the entropy of an isolated system of many particles virtually never decreases with increasing time … Extrapolating this idea, if such is legitimate, leads to the conclusion that the universe as a whole must be tending toward ever-greater disorder. [Christensen, 200–201]

Note Christensen's dual caveat here in his statement: 'the entropy of an isolated system of [1] many particles [2] virtually never decreases with increasing time'. As a matter of fact, Morris notes in the first [1] regard, "there is no arrow of time at the subatomic level" [Morris, 126]. In part, this complication involves certain quantum phenomena which many physicists, including Einstein, have taken to require backwards-in-time signaling of sorts [Davies, 176]. But, in the second [2] regard, it also pertains to the Second Law's entropy dictum.

There are experimental cases where, it seems, entropy does "reverse itself for a short period of time" [Morris, 127]. In a way, such cases do not break the Second Law, inasmuch as its quantum formulation is stochastic (statistical, probabilistic), not categorical and deterministic. But it surely breaks the spirit of the Second Law, as it were, especially as it is purported to delimitate natural existence's irreversibly future-directed arrow of time. Morris summarizes the most typical synthesis of the matter:

> The improbability of large [entropic] fluctuations guarantees that the arrow of time will not disappear in the world around us, even though it may seem to fade away in small, microscopic systems. [Morris, 129]

Or, as Davies states the putative theory-saver: "Noticeable, human scale reversals are staggeringly improbable" [Davies, 227].

Nevertheless, the point remains, as Davies sees it, that "neighboring regions of the universe [may] have mutually reversed arrows of time" [Davies, 226] inasmuch as, for instance:

> Among a collection of chaotically moving particles, there is always a small probability that some of them will be found to be blindly cooperating, perhaps coming together … to form an orderly [anti-entropic] arrangement. [Davies, 226]

Arguably, the Second Law's stochastic formulation in quantum analyses even implies that "if the universe were truly infinitely old, and otherwise unchanging in the large … eventually substantial reversals must occur" [Davies, 227].

The deeper philosophical question, however, is how entropic phenomena (and so also anti-entropic phenomena) relate to time anyway. Suppose that the Second Law's original intent, as it were, does in fact obtain. In the terms of Christensen's above characterization of the entropist approach, its central claim would then be that entropy indeed never decreases (and not merely "virtually never" decreases) and instead always increases (if not in every case for every physical "subsystem" of our universe, at least for the ultimate "isolated system"—the totality of all natural existence); and it unceasingly does so "as time increases."

Precisely how, though, would this help? Our universe (currently) is, for example, increasing spatially as well. It is expanding, and its expansion (currently) is irreversible. We could therefore say that entropy increases also 'with increasing space.' We could equally claim that, since space unceasingly increases with time (or *vice versa*), the reality of "time" is in fact nothing other than just space itself. How, then, does the entropist claim establish entropic processes as constituting, as nature's way of instantiating, time's reality? (Answer: It doesn't.)

Moreover, what the space-time approach purports to be increasing alongside the entropic values of thermodynamic systems is space-time's fourth dimension. But our question here just is: Why equate this dimension with time? What warrants this? Insofar as 'increases with time' means for instance 'as the variable denoting space-time's fourth dimen-

sion increases in numeric value', appealing to the Second Law as the physical expression of time's arrow blatantly just begs this original, primary question.

Perhaps the meaning of 'increases with time' here pertains to certain operations of devices presumed to monitor time in cases where thermodynamic systems are being monitored. As these devices themselves proceed (for example, their digital displays register higher and higher numeric values), they are thus presumed to be monitoring time (or the fourth dimension of their procession) concurrently with monitoring the occurrent thermodynamic processes. Consequently, the same devices are monitoring both time and the thermodynamic processes (or the fourth dimension of those processes' own procession).

Much will be considered later, especially in Chapter 3.3, regarding the relationship between physical processes of purported time-keeping devices and time as such. For now, I just note that the reasoning employed here to identify time with this fourth dimension is comparable to arguing fallaciously: Jan is watching television. Jan is currently also monitoring baby Bob. Therefore, baby Bob is in reality a television. That is, the supposion that certain experimentalist devices indeed do "keep track of" or monitor both thermodynamic processes and time does not entail at all that those processes and time are therefore the same thing.

Claims of Second Law violations—indeed, even just of their possibility (however small)—do, however, demonstrate a fatal flaw in the entropic approach to time's reality. In short, if (whether hypothetically or in real cases) entropy does not increase but instead remains constant or else even decreases, it could only do so "with increasing time." Consequently, the irreversibility (more or less) of entropic processes and time's seeming irreversibility are just not the same.

The possibility (even if only a very extraordinarily minute probability) of neighboring reverse-directed entropic processes, accordingly, does not indicate a linked possibility of reverse-directed arrows of time. Claims to the contrary not only beg-the-question. They are also, it would seem, just false.

Greene explains, moreover, that the relationship between entropy and the Second Law is itself problematic, inasmuch as

> the statistical/probabilistic reasoning behind the second law of thermodynamics applies equally well in both temporal directions. Thus, *not only is there an overwhelming probability that the entropy of a physical system will be higher in what we call the future, but there is the same overwhelming probability that it was higher in what we call the past* … [Consequently, f]rom any spec-

> ified moment, the arrow of entropy increase points toward the future *and* toward the past. And that makes it decidedly awkward to propose entropy as the explanation of the *one-way* arrow of experiential time. [Greene, 261–262]

Notice that Greene here implicitly invokes the distinction between time and temporality, contrasting the arrow of entropy with the arrow of *experential* time. He thus posits that, insofar as his analysis is sustained, its "essential lesson [is] that the entropic arrow of time is *double-headed*" [Greene, 161]. Perhaps, though, one should infer instead that this indicates further why the arrow of entropy (such as it is) is just not the arrow of time.

The notion of an (irreversible) arrow of time is itself challenged by the claim that it pertains only to a certain conception of time, but this is not the only legitimate conception of time. It is in particular commonplace in philosophical discussions of time to distinguish between *linear* time and *cyclical* time. As two actually distinct sorts or conceptions of time, however, this distinction is vacuous. As two related features of time, though, it does at least help clarify the nature of time's inherent uni-directedness.

Proponents of this distinction associate cyclical time especially with classical Greek cosmology as its primary source in Western thought. Classical Greek cosmologists, in particular, commonly thought that our universe (*cosmos*) as a whole is forever destined to reverse and repeat itself. An excellent example is the philosopher Empedocles' notion that our universe proceeds from chaos to order and then back to chaos, whereupon it proceeds once more to order but then back again to chaos, and on, and on. We must be careful, though, not to misconstrue or exaggerate the seemingly reverse-and-repeat character of Empedoclean cosmic history.

For one thing, Empedocles is thinking in very general (indeed, cosmic) terms. It seems plausible to suppose that for him the universe's condition when at the utter pinnacle of order and its condition when at the absolute nadir of chaos are repeatedly the same. Even this, however, is not entirely clear in Empedocles. Each attainment of naturalistically unsurpassable universal order might or might not "look" exactly like every other one—and similarly regarding the universe's dalliances in utter chaos.

More importantly, though, that particular occurrences (whether processes, events, or such local arrangements as a carbon-based replica of me at each moment in my life) shall repeat themselves is in fact not

presumed by Empedocles, nor in classical cyclic cosmology generally. When the notion of a fine-grained or consummately detailed cosmic repetition does show up in classical Greek thought, it rests on a thesis that time is infinite whereas our cosmos consists of a finite amount of material. Its basis and rationale, accordingly, is probabilistic and calculative, and not cosmic cyclicalism as such. Likewise, characterizing the cosmos' second semi-cycle as a "return" does not presume a sort of playing backwards of a comprehensive or fine-grained (indeed, nor even just a somewhat approximate or coarse-grained) record of its prior "forwards" directed semi-cycle.

In the case of our exemplary cyclicalist, Empedocles, the cosmic return-and-repeat of natural existence is a matter of two vying and apposite principles of change: Love and Strife. What repeats is the general character and consequences of these principles' unending competition, as first one of them inexorably becomes more and more dominant until it attains universal hegemony and then the other continually erodes the former's dominance, asserting its own instead, until it attains its own turn at cosmic hegemony. How this overarching cycle of dominance relates to the actual condition and history of natural existence, however, is itself ambiguous.

Love, according to Empedocles, is causative of unity and order; and Strife is causative of multiplicity and disorder. Further, it is reasonable to suppose that for Empedocles the ultimate in cosmic order is a condition wherein every sort of thing to be naturally generated has been generated and all have been assigned a (cosmically speaking) proper place—from the stars and planets located in the immutable Heavens to sublunary beings and "stuffs." Interestingly, though, it is not entirely clear whether this ultimate in cosmic order constitutes the unity and order effected by Love; or whether it is in fact an expression of Strife instead.

Indeed, one of the sorts of multiplicities generated by Empedoclean Strife is a diversity of existent species, forms, or sorts of things. One of its chief effects is to "divide out" and "separate" humans from horses from clouds from planets, and on, and on. Whereas one description of Love's ideal of unity has it subordinating and ultimately dissolving all difference and division. Arguably, then, Empedoclean Love's pinnacle of order is a cosmic condition in which disorder or conflict among existents is impossible precisely because there is no plurality nor diversity of existents to be in conflict, to be disordered with respect to one another in the first place. In contrast, then, the nadir of chaos would seem in

this context to be a condition of such diversification and separateness that our cosmos is a maelstrom of utter naturalistic anarchy and conflict.

On the other hand, Empedocles considers Love and Strife to be responsible, not only for the overarching character of cosmic history, but also for the processes of generation and corruption characteristic of naturally existing things within the cosmos. In this context, Love operates to bring diverse elements together into the unity which is a particular existent, so that in this context Love now seems responsible for the distinctness and separateness of individual things; whereas Strife acts to drive apart a given unity's constituents, and so it corrupts and destroys the individual existent as anything distinct or separate from other things.

More important than sorting out the uncertainties and ambiguities in Empedocles' particular cyclicalism, however, is the fact that it exemplifies the crucial point that classical Greek cyclic cosmologists considered the overarching return-and-repeat character of cosmic history to be exemplary of processes found throughout nature. This includes the generation and corruption, the coming-to-be and passing away, of every natural (sublunary) existent (excepting any incorruptible elements as such). It is most salient and discernible, though, in such returns-and-repeats as the Spring-Summer-Autumn-Winter cycle, the sunrise-daytime-sunset-nighttime cycle, and the like. Significantly, moreover, tracking or counting natural cycles such as these *is precisely how so-called linear time proceeds* and is "measured."

The very notion of cyclical time, accordingly, is opaque. Halpern, for example, characterizes cyclical time this way:

> Cyclical or circular time is the periodic pace measured by a clock or a metronome … Any action that is repeated again and again without change sets the pace of circular time. [Halpern, 1]

This, however, is bizarre. The single most often cited watershed in the development of Westernized linear time is Galileo's discovery of the principle of isochronism, according to which "the length of time (period) of a pendulum's swing depends on how long the pendulum is and not on the width of its swing" [Barnett, 99]. This principle led to the application of an unchanging natural lawfulness to time-keeping, beginning with Galileo's own design for a pendulum clock. Today the most precise means of tracking linear time defines one second as 9,192,631, 770 beats of a cesium atom [Davies, 22].

Still, Halpern contrasts cyclical time (time delineated in terms of "action that is repeated again and again," especially by "natural rhythmic processes" [Halpern, 3])—with linear time as "measured by a calendar or a history book" [Halpern, 1]. But calendars have always been, and still are, expressions of some sort of repeating process—solar cycles, lunar cycles, seasonal cycles, religious cycles, political cycles, diurnal cycles, and the like. And, while such slogans as "history repeats itself" and "nothing new under the sun" are mistaken exaggerations, scientific history does presuppose these sorts of cycles to structure and report its investigations and discoveries. Indeed, analytical history often discerns ways in which human events relate to, even partly result from and themselves sometimes originate, natural cycles (including, for example, various sorts of environmental and sociologic, or psychosociologic, patterns and action-reaction patterns).

The distinction between cyclical time and linear time may be compared to distinguishing the revolutions of an automobile's wheels from its forward motion. One can conceptually distinguish the former and the latter. But to claim that they are two distinct automobile movings is absurd. An automobile's linear motion when it proceeds from A to B and its wheels' revolutions as it does so are aspects of one and the same phenomenon, or process. Indeed, we have just seen that, in regards to time, cyclical (temporal) recurrences and linear (temporally) repeating patterns amount, even conceptually, just to the same thing.

Still, the standard contemporary explication of cyclical (cosmic) time postulates, first, that the cosmos proceeds in cycles which may be distinguished into sequential pairs of semi-cycles, wherein the second semi-cycle is a playing backwards of sorts of the natural history of the first semi-cycle; and, second, that time proceeds correspondently to this defining character of cosmic cycles. Even allowing the first part of this explication, however, this second part to it remains nonsensical.

Suppose, for example, that someone's life proceeds in the manner postulated by the first part of this standard explication of cyclicalism; and consider the second half of her life, in which she is presumed to un- or reverse-age. Her un-aging would, of course, commence at precisely the (temporal mid-point) age she is at that moment—say, forty years of age. Even as her un-aging approaches reverse-adolescence, however, it will remain true that she had been the mature adult she once was and that she is yet to be the infant she is again becoming. And, when

she reverse-arrives at the moment of her (un)birth, her life span will have consisted of two forty-year aging-*cum*-unaging periods so that she will then be eighty chronological (temporal) years old. She would not somehow suddenly be nil (zero) years of age instead.

Indeed, classical cyclic cosmologists did not intend to deny the Greek axiom that time is infinite. Nature's "returning" phase is temporally continuous with its prior "proceeding" phase. The phases occur one after the other with respect to a single linear passage of time. Plato's conception of the cosmic cycle, for instance, is termed the Great Year precisely because each cycle is itself but one phase (one great-year) in the ongoing (and unending) great-year by great-year history of our cosmos, in which the first solar or stellar year of one Great Year commences precisely at the conclusion of the final solar or stellar year of the preceding Great Year.

From the perspective of natural philosophy, accordingly, everything happens just in whatever way and order it in fact happens and not in some other way or order. This may in fact be the best way to characterize the notion of time's putative irreversibility. The uni-directedness this seems to impute to natural existence (or its proceeding), moreover, is more fundamental than any cyclical natural history as such—including in its current scientific version, the notion that our universe began with a Big Bang and will end in a Big Crunch (if not in a Big Fizzle instead). It is more fundamental as well than any particular sort of natural phenomenon or process (for example, entropy).

The seemingly more robust and fundamental character of time's irreversibility also explains why the notion or possibility of time travel is as much a logical and conceptual conundrum as it is a matter of what nature allows and applied science can do. I shall not, however, pursue this topic here.

Authentic (classical) Eleatics would not be surprised at contemporary physicists' difficulties with posturing their scientific Eleaticism as an account of time's reality, inasmuch as Eleaticism's defining thesis concerning time is that it is not real. To defend or demonstrate the reality of time thus requires refuting Eleaticism. Asserting that time is real while propounding Eleaticism, as contemporary scientific Eleatics do, is incoherent. The very way in which scientific Eleaticism purports to account for time's reality thus guarantees that whatever it is that this accounts for, it is not time.

The puzzle of time's reality did not somehow just present itself to classical Greek thinkers, after which Eleaticism came along as one pro-

posed solution among others. Rather, the problem was introduced and delineated by the Eleatic philosophers in their doctrines and arguments denying real existence to time.

Accordingly, nor is this merely a dispute over branding, over whether traditional Eleaticism has a prior right to the label 'Eleaticism'. What's at issue, rather, is what the philosophical problem of time's reality in fact is and what is required to demonstrate that time is indeed real (or else, to fail to do so). To see this, consider the so-called *traveling arrow* argument devised by the classical Eleatic philosopher Zeno of Elea. The gist of the argument is something like this:

Consider an arrow which appears to be moving toward a target. At each moment of its apparent flight, the arrow occupies a location of space (a spatially situated volume) identical to itself (its dimensions). But insofar as the arrow *occupies* a given spatial location, it is not moving through or with respect to that spatial location. Hence, at each moment of its apparent flight, the arrow is in reality not *moving* through but instead occupying some spatial location. The space through which the arrow appears to fly on its way to the target, however, is just the summation of the spatial locations the arrow occupies at each moment of its apparent flight. Therefore, at no moment of its apparent flight is the arrow in reality moving. It only appears to be.

This argument does not explicitly argue for the unreality of time but for the unreality of motion. However, commentators have generally considered it to imply indirectly that time also is unreal. What is important for now, though, is the image of natural (real) existence it conveys. The contemporary space-time approach has been characterized as propounding a block-universe image of natural existence, wherein time is space-like or static. Arguably, this is precisely the sort of image Zeno conveys in his traveling arrow argument against the real existence of motion.

My rendition of Zeno's argument asserts that the arrow appears to be moving toward a target and proceeds to analyze its apparent motion. The Eleatics emphatically distinguished *appearances* and *reality*. The former refers to how we experience our world by virtue of our five sensory modalities: vision, hearing, taste, touch, and smell. Whereas *reality* refers to the actual character of our world independently from how we experience it—or, absent anything we may ascribe to it only in virtue of how we experience it.

In these terms, we may think of the traveling arrow argument as

addressing the question: Can we (truly) ascribe to the real arrow itself what we see when we see it flying (moving) toward a target, or is what in reality transpires for the arrow different from how it visually appears to us?

Arguably, Zeno's argument intimates what today is often characterized as *cinematographic* motion. This notion derives from the difference between what we see and what actually happens when we watch a motion-picture (cinema). A motion-picture consists of a series of still-frames of actors and other compositional elements which, when projected sequentially in front of a viewer (at a sufficient rate), appear to him to move. The movie-watcher thus sees actors and other compositional elements moving in various ways, even while what actually "happens" (on the movie screen) is a sequence of still-frames, none of whose contents include actual motions.

I am not purporting that Zeno propounds a cinematographic account of motion. How the Eleatics (in this regard, both traditional and scientific) understand the relationship between appearances and reality is itself an enigma. Still, the importance of the cinematographic imagery is that what, on this account, actually transpires for the real arrow itself is indeed different from what we see, from how it appears to us; and this difference comports well with scientific Eleaticism's image of the block-like or static character of real existence.

Zeno thus conveys a static image of reality; and he concludes that therefore motion is simply not real. In Zeno's "real" universe nothing actually moves.

In Zeno's Eleatic approach, then, the concept *motion* is anchored in human experience. It denotes what we see when we watch something move. A static arrow, however, is an unmoving arrow. The contrast notion to 'static' is *dynamic*. What we see when we watch an arrow flying towards a target is dynamic in character. Motion without its dynamic character is not motion. Accordingly, the concept *motion* is entirely empty when used in reference to something static.

Zeno's argument does not depend on the fact that it presents an example of locomotion (motion through space). Classical Greek thought subsumes locomotion under the more general notion, alteration. (Alternatively, some Greek philosophers understood the notion of motion itself to canvass every sort of change or alteration.) Accordingly, Zeno could just as well have proposed that we imagine a leaf which remains located (stationary) where it is while undergoing an Autumnal color-change. In this case, the argument might go something like:

At each moment of its apparent color-change, the leaf is just the color it is and not any other color. It is not only just where it is, and not somewhere else. It also is just what it is, and not something different. But insofar as something is a certain color it is not changing with respect to that color; and the leaf's Autumnal color-change is just the summation of the colors it is at each moment of its apparent change. Therefore, at no moment of the leaf's apparent color-change is it in reality changing. Therefore, the leaf is not in reality changing.

But what is dynamic motion? What are we specifying when we claim that motion is real only if real existents dynamically move?

In technical terms, dynamic motion is motion explicated in terms of force(s) or energy. Here, though, we are interested in the dynamic character of motion as a feature of how we experience moving objects, whence our concept of motion derives its primary meaning.

In terms of experiential imagery, an arrow's dynamic motion is indicated by the difference between, for example, checking on the arrow each morning and merely noting that it is located closer to the target each time, and instead watching it fly toward the target "in real time." In the former case, while one would likely be exceedingly perplexed about what's happening with the arrow, he would not perceive it to be moving toward the target.

But, why not? What's missing? Why in the latter case do we perceive the arrow (dynamically) moving toward the target, and not merely occupying a series of locations positioning it closer and closer to the target?

The phenomenon of cinematographic motion does suggest that this is partly because the arrow's orientations and locations with respect to space occur in a much more condensed period of time (a point I will return to in Chapter 3.4). This, however, does not explicate the dynamism of its flight. Rather, its dynamicism relates to how the arrow's distancing itself from the bow and approaching the target appears to an observer as a single ongoing, uninterrupted, seamless phenomenon.

More precisely, as the arrow moves dynamically, its motion incessantly exhibits a certain ongoing anew- or renewed-ness. Dynamic motion seems continuously, seamlessly anew, or ever-new. If this is not being exhibited by the real arrow itself but is only an artifact of experience (or, of its apparent content, or appearances), then the arrow's purported motion is not real—its motional-appearance is not characteristic of what actually transpires regarding the real arrow.

Many commentators have understood Zeno's arguments challenging the reality of motion to imply the unreality of time as well. This is not because Zeno identifies time with motion. Time exists for (relationally) static natural existents (the Greeks say "at rest" natural existents) as much as for moving or changing natural existents. Time passes while my radio sits on the table, for instance, just as it does while a butterfly flits outside my window.

Nevertheless, our concept of time is especially closely associated with (dynamic) motion. Arguably, time passes for the radio sitting on my table because the universe, or at least my experiential universe, is still a universe of motion and change. How long would it take, for instance, for a person to lose all sense of time (or even that there is such a thing as time) if unmovedly situated in a room wherein nothing whatsoever ever seems to move at all?

Could time be real even if motion is unreal? Could reality be entirely unmoving and yet still be temporal, still include time?

Contemporary scientific Eleatics in effect answer this question in the affirmative—even while they instead rely upon dynamic processes, and utilize examples involving dynamically moving things, to explicate the actual character of time. The classical (traditional) Eleatics, however, emphatically answered this question in the negative. For them, an entirely unmoving universe could not be a temporal universe.

Not only is our concept of motion anchored in experience; so, too, is its intimate relationship with time. Time's existential fate is joined to motion's in part because motion's dynamic character seems (experientially and conceptually) prototypically time-like. This is not surprising since our concept of motion in effect imparts its sense of dynamicism to our concept of time, even though time is not reducible just to motion.

What dynamicism means with respect to time as such may or may not be precisely the same as it is for motion. Temporal dynamicism may or may not just be the same as kinetic (motional) dynamicism. But they surely are conceptually (and, arguably, experientially) linked and akin.

The philosophical problem of time, accordingly, is not a question of whether someone (or some group—for instance, physicists) is able to designate something to be time and then convince others to call it 'time' as well. The problem of time, rather, questions whether there in reality exists something dynamic (or, whether there is something dynamic about reality) which exhibits time's inherent dynamicism.

Refuting Eleaticism, accordingly, requires demonstrating or, minimally, defending a dynamic account of time's reality. Time entirely severed from temporality is not time. A purported static account of time, therefore, is in fact a denial of time's reality instead.

CHAPTER THREE

THE MAKINGS OF A TEMPORAL UNIVERSE

Authentic Eleaticism demands a temporally dynamic account of real existence, or else concludes that time is unreal. It demands that one not try to skirt the issue by excising temporality from time. Although I am following contemporary convention in this investigation and referring at times to the notion of static accounts (or conceptions) of time, strictly speaking atemporal time is not time. What is not temporal is, rather, eternal.

I have attempted to articulate our experiential encounters with dynamic existents or phenomena as involving a sense of their ongoing newness, continuous anew-ness, uninterrupted ever-newness, incessant renewd-ness, or some such. Regarding time, we use various metaphors and images to convey this sense. One likens time to a river: Time flows. It also flows past us, or else bears us along with it. Or, time passes, and it passes-by and -for us. It marches on, too. Sometimes, like Zeno's (apparent) arrow, time even flies.

As these examples attest, images pertaining to natural motion dominate our thinking about time's dynamicism. But, insofar as we intend thereby to depict time (or, nature's temporality) as itself something which moves (flows, passes, marches-on, flies, or the like), how do these images pertain to time? What about time, or temporal existence, warrants or conjures such images?

This chapter discusses four possible aspects of temporality which seem especially pertinent to explicating its dynamicism. The first was introduced in Chapter 1 as, however, conceptually puzzling and existentially problematic.

3.1. *Pastness and Futurity*

From an authentic Eleatic perspective, a static conception of time—for example, as an added space-like dimension to natural (three-dimensionally spatial) existence—cannot explicate nor account for time's reality. Such an ontic appendage to natural existence may seem a

bit more temporal, though, if we relate the distinction between *earlier than* and *later than* to its faux-time dimension and its constitutive line-of-time(s)—for example, if we posit that an existent or phenomenon located sequentially prior to another with respect to this dimension is thereby *earlier than* it and, conversely, one located sequentially subsequent to another with respect to this dimension is thereby *later than* it.

Indeed, such assertions as 'Her flight's projected arrival keeps getting later and later', 'It will happen sooner [earlier] than you think', or 'During Springtime, the sun rises earlier and earlier and sets later and later each day' do seem to hint at time's fluidity, motion, dynamicism. Insofar as such assertions may be related to a static account of time, they may imbue it with a tint of temporality, and so instigate a sense that the account indeed accounts for time. Indeed, in contemporary philosophy of time, the relational distinction between earlier-than and later-than has often been associated with static conceptions of time.

Merely parsing the distinction between sequentially-prior and sequentially-subsequent in terms of earlier-than and later-than, however, does not necessarily connote a temporal ordering or relationship at all. We can, and do, use these same terms to denote prior and subsequent items in atemporal sequences—for example, 'The number 3 occurs earlier in the series of positive integers than the number 5,' or 'The chapter on quantum physics occurs later in the book than the chapter on special relativity.' Accordingly, merely relating assertions utilizing these terms to a sequential ordering, say, of putative times-when constitutive of some dimension of a block universe need not connote any sort even of faux-dynamic temporal relationships any more than, for instance, higher-than and lower-than, or to-the-left-of and to-the-right-of, connote a dynamic-ish conception of space.

Arguably, earlier-than and later-than are distinctly temporal notions just insofar as the former denotes something which already has been with respect to the latter and the latter denotes something which is yet to be with respect to the former. That is, one thing exists or occurs temporally earlier than another just in case it will have already existed or occurred when the latter does; and something exists or occurs temporally later than another just in case it is yet to exist or occur when the latter does.

But, saying that something already has been is long-hand for calling it 'past'; and saying that something is yet to be is long-hand for calling

it 'future'. Accordingly, earlier-than and later-than seem distinctly temporal notions only if conceptually linked to the distinction between past and future.

Given this conceptual linkage, philosophers who associate the earlier-later distinction with static accounts of temporal ordering should equally consider the past-future distinction compatible with static accounts as well. And yet, just as contemporary philosophers of time typically associate the earlier-later distinction with static accounts, so too do they typically associate the past-future distinction instead with dynamic accounts of time.

Some contemporary philosophers focus their investigations on the semantics of temporal discourse, and recast the fundamental dichotomy between apposite accounts of time to be between *tenseless* and *tensed* conceptions of time. Tenseless conceptions maintain that temporal discourse may be reparsed or semantically analyzed in terms of tenseless assertions; whereas tensed conceptions deny this, particularly with respect to past-tensed and future-tensed discourse. This contrast is often associated, though, with the distinction between static and dynamic accounts of time. Tooley thus notes (with partial disagreement) that

> most philosophers would hold both that tensed concepts can be semantically basic only if the world is a dynamic one, and that tenseless concepts can be semantically basic only if the world is a static one. [Tooley, 18]

I shall not pursue the nettle of issues specific to the tensed-tenseless distinction, nor the distinction itself. I shall continue working instead from the distinction between dynamic and static accounts of time (again, even though 'static account of time' is strictly speaking an oxymoron).

The early 20th Century work of John McTaggart—in particular, his discussion of time in *The Nature of Existence*—is foundational for many contemporary philosophical treatments of time, and a principal source of the contemporary association of earlier-later with static (or tenseless) conceptions of time and past-future with dynamic (or tensed) conceptions of time. McTaggart's influence on this contemporary disconnect between the earlier-later and past-future distinctions, as indicative of two fundamentally different sorts of accounts or conceptions of time, is difficult to understand given the ambiguities, and in fact inconsistencies, in his discussion.

Consequently, though, some consideration of McTaggart's discussion is instructive for exploring the relationship between this pair of distinctions. It also highlights a fundamental difference between contem-

porary and more traditional approaches to the past-future distinction itself.

In one crucial respect, McTaggart is entirely consistent and unambiguous: He adamantly denies the reality of time. He is unwavering in his insistence that time is unreal. To do so, moreover, he links time with temporality. Echoing classical Eleaticism's perspective in this regard, he argues:

> It is true, no doubt, that we perceive things as in time, and that therefore the unreality of time involves the occurrence of erroneous perception … [Hence,] any theory which treated time as objectively real could only do so by treating time, as we observe it, as being either unreal or merely subjective. It would thus have no more claim to support from our perceptions than the theories which deny the reality of time. [Farmer, 206]

McTaggart is asserting here that an account which implies that time "as we observe it" is unreal (or merely subjective) is equivalent to one which explicitly denies real existence to time altogether.

A sustainable (indeed, even just a legitimate) account of time's reality, according to McTaggart, would have to account for time "as we observe it." But, he argues, time in this sense (as temporality) is unreal. Therefore, time is unreal.

McTaggart considers past and future especially integral to temporality, and also the principal culprits behind its unreality. He says, for instance, that

> the distinction of past, present, and future is as essential to time as the distinction of earlier and later, while in a certain sense it may … be regarded as more fundamental than the distinction of earlier and later. And it is because the distinctions of past, present, and future seem to me to be essential for time, that I regard time as unreal. [Farmer, 188]

One might read this passage, taken out of context, as distinguishing past-present-future conceptions of time from earlier-later conceptions, and as suggesting that each is in its own way an essential aspect of temporality (though alleging that the former somehow is "more essential"). One might then also, from this alone, suppose that, were the earlier-later distinction the more fundamental of the two, McTaggart would not claim that time is unreal. Consequently, the two distinctions may indeed seem related to different conceptions of time—perhaps, in particular, one to dynamic and the other to static conceptions of time. This, however, is not McTaggart's view.

McTaggart posits that natural existence exhibits a sequentiality and ordering which may be thought of in three ways, which he dubs 'A-

series', 'B-series', and 'C-series'. An A-series of natural existents considers past, present, and future integral to their sequential ordering. A B-series instead explicates such an ordering using the relational distinction between earlier-than and later-than. Whereas, a C-series does not utilize temporal concepts at all. A C-series, rather, would in effect be just a serial description of existents and phenomena as constituents of nature's order. An example of a C-series would be the solely naturalistic description of what happens at equinox posited in Chapter 1.

McTaggart recognizes that nature's denizens and phenomena surely do constitute a C-series. That is, natural existence surely does constitute and exhibit an ongoing history of sequentially related existents and phenomena. A C-series, however, is as such atemporal. Insofar as nature's order constitutes a C-series alone, accordingly, it is atemporal. The question in regards to the reality of time, then, is whether natural existence also constitutes an A-series or a B-series (or maybe both).

We have already quoted McTaggart insisting in effect that real existence definitely does not constitute an A-series, inasmuch as past-present-future temporality is unreal. According to McTaggart, past-present-future temporality is, rather, an artifact of "erroneous perception." McTaggart maintains, though, that natural existence also does not constitute a B-series.

McTaggart's thinking in this regard seems akin to my suggestion earlier in this chapter that the notions temporally earlier-than and temporally later-than are conceptually linked to our notions of past and future. The more general notions just of earlier-than and later-than are by themselves not necessarily temporal in meaning or intent at all.

McTaggart maintains, accordingly, that *the earlier-later distinction depends, for its sense as denoting a temporal relationship* between sequentially ordered items, *upon the past-future distinction*. Consequently, the (temporally) earlier-later distinction could not be more fundamental than the past-future distinction—*nor can it be independently applicable* to nature's order—since it presupposes, indeed derives from, the past-future distinction. And therefore, McTaggart logically concludes, natural existence constitutes neither an A-series nor a B-series. Its reality is entirely atemporal *tout courte*.

Unfortunately, though, McTaggart's surrounding discussion does not seem to remain faithful to this overarching logic. He, for example, also characterizes an A-series as

> that series of positions which runs from the far past through the near past to the present, and then from the present through the near future to the far future, or conversely. [Farmer p. 188]

In these terms, however, a McTaggarty A-series is just a series of "positions" distinguished into a subseries of positions termed 'past' followed by a position termed 'present' and then by another subseries of positions termed 'future'—and where more or less past and more or less future are then functions of a given past- or future-position's positional distance from the present-position. But this does not convey a dynamic conception of time, or of its pastness and futurity. At the very least, it is entirely consistent with a static conception of time, including the contemporary scientific Eleatic approach examined in Chapter 2.

The strongest case for understanding McTaggart to intend a dynamic conception of time is his interlinking the real existence of time with the real existence of change. McTaggart argues, in particular, that change presupposes A-series time inasmuch as a given change consists of an event which

> was once an event in the far future. It became every moment an event in the nearer future. At last it was present. Then it became past, and will always remain past, though every moment it becomes further and further past. [Farmer, 191]

Consider a case of a metal poker becoming hot—that is, changing from cold(er) to hot—on a certain Monday. McTaggart argues:

> It is always a quality of that poker that it is one which is hot on that particular Monday. And it is always a quality of that poker that it is one which is not hot at any other time … The fact that it is hot at one point in a series and cold at other points cannot give change, if neither of these facts change—and neither of them does. Nor does any other fact about the poker change, unless its presentness, pastness, or futurity change. [Farmer, 193]

That the poker changes in purportedly "becoming" hot cannot be explicated, McTaggart is claiming here, just by depicting or describing its "changing" condition serially. But, why not? Because a serial description of this sort would constitute a McTaggarty C-series; and McTaggart has claimed that a C-series is as such atemporal.

Plausibly, McTaggart has in mind here something akin to Zeno's thinking about his arrow (glossed in Chapter 2), so that a C-series description of McTaggart's poker's natural history would be entirely consistent with a reality in which a series of existents corresponding to the "moments" constituting the serial description just happen somehow

to succeed one another without any of them having resulted from an actual change with respect to what preceded it (much less on the part of the poker as such). In short, a difference is not necessarily a change (or, more precisely, an outcome of a change). Change may always results in a difference of some sort. But, a difference may exist without it having resulted from—without owing its existence to—some change.

What such a C-series description of McTaggart's poker is lacking in order to express or account for its becoming hot (for its therein changing) is, McTaggart argues, appropriate reference to past, present, and future. The C-series description, in other words, needs in effect to be appropriately emended so as to transform it into an A-series description.

McTaggart's B-series notion is irrelevant here inasmuch as, recall, a B-series must be reparsed as a proper A-series to articulate its temporal meaning; otherwise, it effectively reduces to—it adds no (temporal) meaning to—the correspondent atemporal C-series. Whereas, in the terms of McTaggart's analytic ontology, an A-series description transforms the "fact" of the poker's differing character (at a certain "moment" of its natural history compared to previous ones) into an "event"—into a single connecting phenomenon or happening in virtue of which the poker is not merely recognized to be (in fact) different but rather to have become different.

And yet, McTaggart began his poker example with the peculiar assertion: "It is always a quality of that poker that it is one which is hot on that particular Monday"! What actually changes, on McTaggart's account, is the presentness, pastness, and futurity of this fact (or of the particular hot-quality-of-the-poker-on-a-certain-Monday this denotes).

McTaggart's notion that the poker's change is a function of its (or of its particular hotness-on-a-certain-Monday's) presentness, pastness, and futurity instead of owing to the poker's temperature, molecular excitation, and the like, is by itself extraordinarily unenlightening and bizarre (Cf. my discussion of "properties" in Chapter 1). Even so, what "changes" for McTaggart is not whatever it is that his account purports changes being present, past, or future but its having presentness, pastness, or futurity. Even this, however, still oversimplifies his account.

McTaggart has also explicated change as a matter of some pertinent "event" beginning in the far future and becoming every moment futurely nearer until it becomes present, whereupon it becomes past and indeed forevermore becomes every moment further and further past. Huh? What could this possibly mean?

Plausibly, McTaggart characterizes the "event" in question as beginning in the future and proceeding thence toward the present as a way of capturing the *arrow of time* notion discussed in Chapter 2, inasmuch as this notion seems to imply that before something actually exists or happens it can only be something which will exist or happen. In particular, of course, it cannot instead be something which (already) has existed or happened. Conversely, once something has existed or happened it can nevermore be something which will exist or happen. It, indeed, can then only be (and in fact forevermore will be) something which has (already) existed or happened.

Understood this way, McTaggart's time-trekking event characterization of time actually makes sense. However, it is then entirely consistent with his earlier static characterization of time as in effect a line-of-times wherein, in relation to whatever "position" is dubbed 'the present', the semi-line-of-times thought to precede it constitutes the past and the semi-line-of-times thought to succeed it constitutes the future.

To see this, let us abbreviate the "fact" of the poker's particular-hotness-on-a-certain-Monday as P. On the above sensical understanding of McTaggart's characterization of change, strictly speaking P does not as such exist in the future. What exists "in the future" (at a given future time-position relative to the time-position of P's existing or happening) is the related but different fact that *P will exist or happen* in such-and-such many time-positions. Likewise, once P has existed or happened, what then exists "in the past" (at a given past time-position relative to the time-position of P's existing or happening) is strictly speaking again not P but the different *albeit* related fact that *P has (already) existed or happened* so-and-so many time-positions ago.

McTaggart's account of his poker's purportedly "becoming hot" thus seems in effect to amount to the notion that, at every time-position other than the time-position of P's actual existing or happening, appropriately related but different "facts" are located indexed one-to-one to the line-of-time-positions constitutive of nature's faux-temporal dimension (where 'appropriately related' is determined by the time-position of P's actual existing or happening being *ex officio* dubbed 'the present'). Accordingly, although McTaggart seems intent on a dynamic conception of (A-series) temporality (or so he is typically understood), his actual discussion and perspective is, minimally, consistent with a static account of time.

McTaggart's presumption that past and future are two parts of a

triumvirate constitutive, along with the present, of temporal order is a major departure from classical Greek thinking, wherein past and future alone are the principal "parts" of time. For example, we shall see in Chapter 4, Aristotle prefaces his own account of time with an argument attributed to Parmenides to the effect that: Time consists of the past and the future; the past is unreal; the future is unreal; therefore, time is unreal. Responding to this argument, we shall see in Part II, is in fact a primary unifying theme of Aristotle's investigation into the nature and reality of time.

At least in McTaggart's case, moreover, his inclusion of the present in his characterization of (A-series) temporality in fact adds to the obscurity of his account. Arguably, his characterization of (A-series) temporality derived what aura of temporal dynamism it might initially have from his description of its constitutive "positions" as running to the present from the past and proceeding from there into the future (or *vice versa*). Even this aura, however, dissipates when we read McTaggart's characterization of the present, or presentness. In particular, he avers that:

> when we say that M is present, we mean that it is present at a moment of present time, and will be past at some moment of future time, and … when we say that M is past we mean that it has been present at some moment of past time, and is past at a moment of present time. [Farmer, 205]

Every time, in other words, is as such just a present time. The present time is a time whose present happens to be the "moment" (time) designated to be the present time, and so in relation to which other times shall consequently be past or future ones. Accordingly, for McTaggart, a past time is just a time whose present is past with respect to such an arbitrarily designated temporal present. Presumably a similar remark applies to any purported future times.

But any time subsequent to a past time would be a future time in relation to it and any time prior to a future time would be a past time in relation to it; and this includes the one designated to be the present time. McTaggart's invocation of presentness thus seems not to add anything (except, perhaps, further obscurity) to his account of (A-series) temporality.

Still, McTaggart is, arguably, rightly headed in insisting (given his triumvirate presumption regarding time's constitutive parts) that "the distinctions of past, present, and future … [are] essential for time." For instance, we saw in Chapter 2 that a distinctive characteristic of

the faux-time posited by the space-like or block universe static-time conception is its rigidly replete ontic homogeneity—wherein every time whatsoever is equally, entirely, unchangingly real (as it were, for all time). And, while 'every time whatsoever' here in a way connotes every time which (ever) has been and every time which (ever) will be, from the static-time perspective the notion that something *has been* does not connote in turn that it *no longer is* (and so in fact *is not*) and the notion that something *will be* does not connote in its turn that it *is not yet* (and so, again, in fact *is not*).

Notice, however, that static-time's distinctive character does pertain principally to pastness and futurity, to past existents (and so their "times") and future existents (and so their "times"). Indeed, we have seen, in McTaggart's case, his inclusion of "the present," as equally "essential for time" along with past and future, plays a pivotal role in rendering time effectively atemporal, as he seems in effect to have been misled by the arguably plausible presumption that the reality of any (particular) time is a function of its relation to the present into presuming as well that a past or a future time's pastness or futurity is secondary to or derivative from its own presentness. The present thus became in fact "more essential for time" than past and future in McTaggart's subsequent treatment and, consequently, every (particular) time became first and foremost just another (present) time.

I am not suggesting that the present's fate in McTaggart's treatment is inevitable, that *the present* must reduce conceptually to designating nothing more than just *some (a particular) time*. Still, in classical Greek philosophy, the present was typically not treated on a par with past and future to conceptually and existentially delineate (dynamic) time. The morale drawn from this, however, was typically opposite to McTaggart's: Past and future, rather, were treated in effect as more essential for time.

The notion that presentness, or the present, is an integral feature of temporality will be examined in detail later, in Chapter 3.4. The remainder of this subchapter will work from the more traditional perspective on time's dynamicism as explicable in terms of the past-future dyad. Insofar as I may still find the term 'presentness' (or 'the present') useful, I shall use it similarly to the primary sense of the classical notion of *the now*—namely, to mark time's transition from past into future (or *vice versa*)—instead of as a (distinct) particular time (or constitutive part of time) as such.

We can begin to see how the past-future distinction, considered first

and foremost to distinguish respectively what no longer is and what is yet to be, might pertain to a dynamic conception of time's reality by highlighting two other features of McTaggart's perspective. The first concerns his conception of past and future as such—that is, even apart from any of the foregoing points regarding presentness (or the present). The second concerns how he relates past and future—again, *as such*—to change.

In the first regard, McTaggart is caught up in the notion that every time must be a particular time. In the case of past and future, accordingly, we have seen him immediately characterize the past as in some fashion a certain set or series of particular times, and likewise regarding the future.

To be sure, there is some plausibility to thinking of past and future this way. When thinking about Caesar having crossed the Rubicon, for instance, I may indeed in a way think of this historical event's temporal pastness in terms a sort of line-of-time(s) leading from it and connecting it to now, to when I am thinking about it. Similarly, when thinking about next summer's vacation, I may in a way think of that eventuality's temporal futurity in terms of a line-of-time(s) of sorts proceeding from when I am thinking about it to that happy time when, if all goes well, I will indeed be flying away to Buenos Aires.

Arguably, though, thinking about pastness and futurity in these ways presupposes another, more fundamental sort of conception of past and future—a more indeterminate, amorphous, unparticular sort of conception. This point may be more obvious to explain in the case of futurity.

When I think about flying to Buenos Aires next summer, for instance, in regards to reality my thoughts are principally self-referential. My longingly thought-about vacation in a very real sense exists only in my own mind. Otherwise, there in reality exists only the current city of Buenos Aires, the airline ticket and tourbook I've purchased, and the like, for my thoughts to reference indirectly. The McTaggarty notion that my flying to Buenos Aires (supposing that I shall in fact be doing so) would somehow already be temporally lurking out there at a certain particular future-time is an obfuscation.

From my perspective, the future is, rather, an immense, possibly endless and unbounded, ontic expanse—an existential blank tablet or void of sorts. Insofar as I envision something like a line-of-time(s) proceeding into that expanse in next summer's direction, what I am more properly speaking envisioning is a continuation of real (natural) existence until

it eventuates in whatever all shall in fact exist when (I currently imagine and hope) I am myself seated comfortably in an airliner bound for Buenos Aires.

I may not think about the past quite as nebulously, vacantly. Still, the degree of specificity or particularity with which I think about the past is circumscribed especially by whatever current mental or physical traces, indicators, or evidence pertinent to preceding existence is readily at mental or physical hand. Otherwise, from my perspective, the past is mainly a huge, maybe also limitless, hazily jumbled obscure expanse of mostly unknown and unknowable, existentially defunct, ontically erstwhile phenomena (or, rather, unphenomena).

Insofar as I happen to think, for instance, about Caesar's crossing of the Rubicon and in so doing may in a vague way envision something like a line-of-time(s) meandering its way to my now, what I am more properly envisioning is again real (natural) existence's unbroken continuance since Caesar's day until its current eventuation in (along with innumerably many other things) my sitting at my computer composing these reflections and ruminations.

Arguably, McTaggart is correct to interrelate the real existence of time and the real existence of change (or motion). We have now seen, however, how his fixation with particular times and (pre)set lines-of-time(s), his awkward ontology of "facts" and "events" and the like, and his understanding and use of the past-present-future distinction, in fact conceptually play into Eleaticism's hands. The sort of change McTaggart focuses on, moreover, is not conducive to articulating time's and change's interrelationship in a way which sheds light on the dynamic character of time and, especially, of pastness and futurity.

McTaggart focuses on changes in particular natural existents' condition or character—for instance, the temperature of his poker. To fully appreciate, however, the significance and meaning of the traditional equation of the natural universe with temporal reality, on the one hand, and with the domain of motion and change ("the world of becoming"), on the other, here again we need to relate pastness and futurity to natural existence at a more fundamental and universal level—indeed at the level just of natural existence as such.

Classical Eleaticism, accordingly, denied the reality of any sort of coming-to-be (genesis) and ceasing-to-be (corruption) whatsoever, including the coming-to-be and ceasing-to-be of natural existents as such. Perhaps pastness and futurity—though obviously pertinent to local and particular motions and changes—are more discernible and explicable

in terms of the, as it were, existential journey or "motion" of natural existence as such.

A space-time proponent (leaving aside certain pertinent issues regarding Relativity Theory to be discussed in Chapter 3.2) may in a way agree with this, inasmuch as space-time's fourth dimension is not meant to be real somehow independently of or apart from natural existents themselves. On the space-time approach, however, my conceit of nature's existential journey would refer just to every real (natural) existent's spatio-temporal extension as this is delineated (statically circumscribed) by the space-time coordinates of each existent's inception and the space-time coordinates of its ending. Accordingly, pastness and futurity—what no longer is and what is not yet—are not as such, on the space-time approach, integral to a space-time existent's sojourn in real existence.

Suppose instead, then, that real existence is itself a dynamically ongoing process, irrevocably linked to pastness and futurity. Suppose, in other words, that natural existence itself, universally, proceeds such that its incessant anewness—whatever differences (changes) this may encompass on the part of its various constitutive existents—continuously demarcates what has already come-to-be (including what also has entirely ceased-to-be) from what has not yet come-to-be (including what has not as such yet ceased-to-be).

Chapter 2 postulated that the principal meaning of "time's arrow" in regards to natural existence recognizes that everything exists or occurs in just the way it in fact exists or occurs and not in some other way. We typically presume as well, concordant with the "arrow" imagery for this fundamental notion, that this thereby yields a certain (irreversible) directedness to time. Actually, though, this inherent directedness to nature's temporality may, with respect to its pastness and futurity, be articulated in either of two ways—as "aiming" nature's existential procession from either of these (towards the other).

One may think of real existence as always progressing from the past towards the future inasmuch as reality in a way always looks toward the future. That is, natural existence may be thought to be, in virtue of its temporality, inherently future directed. Natural existents, consequently, come-to-be from what already has been and cease-to-be by virtue of their ontically yielding to what is yet to be.

Alternatively, one may think instead of time as flowing pastward from the future. Futurity, from this perspective, serves as the existential horizon (rather than destination) of reality's continual, incessant,

ongoing up-welling and passing-by. That is, natural existents come-to-be from what is yet to be and cease-to-be by joining what already has been. They, accordingly, are always *yet-to-be* before they *are*. Whereas, from the previous perspective, real existents always *were-not* before they *are*.

There are also approaches intermediate between this proposal and Eleaticism. The most plausible such approach denies pastness while retaining futurity. It posits that past existents are in fact (still) real, whereas future existents are indeed not (yet) real. On this approach, which Barry Dainton terms the *growing block universe* [Dainton, 69], reality includes past existents but not future existents—where past existents are not past in the sense of no longer being (existent), of having ceased-to-be real, but in virtue of the fact that as reality proceeds it accumulates existents in an ordered fashion. A past existent, accordingly, is (still) real but it is no longer among the newest ontic kids on the (ever growing) existential block.

The growing block universe approach is consistent with thinking of real existence as itself a dynamic process in its own unique way—in particular, as an unremittingly accumulative existential process. An authentic Eleatic, accordingly, would not consider it to be intermediate somehow to the question of time's reality. The future remains unreal. Reality, an Eleatic would point out, would still consist (even if only partially) of unreality.

Another sort of intermediate approach challenges an assumption of my investigation thus far: That real existence is all-or-nothing. In other words, I've been presuming that either something is real or else it is unreal. Maybe, though, there are gradations to reality or "realness." For example, real existents may (like memories) dim, fade, or melt (existentially speaking) into the past and perhaps (like anticipations) gleam, brighten, or solidify from out of the future. Neither their coming-to-be nor their ceasing-to-be is instantaneous. One might, on this approach, postulate that the more past something is the less real it is, and the less future something is the more real it is.

A graded or "fuzzy" conception of real existence is, however, difficult to specify precisely and cogently. Supposing that something which happened a century ago, for instance, may somehow still be more real—may somehow be less unreal—than something which happened a millennium ago seems strange. So does proposing, for example, that someone's recently deceased relative may nevertheless still be more real than one's deceased ancestors of previous generations.

To be sure, more recent past phenomena or existents may in a way be more likely in fact still to exist, to have in fact not yet entirely ceased-to-be, than are more remote phenomena or existents. But, in that case, we would not generally think of them as genuinely past in regards to their real existence.

Similarly, regarding the futurity side of this proposal, should we say that my niece's future children are already now more real than her future grandchildren? Does it at all make sense to think of something which is yet to be (that is, a future existent) as nevertheless somehow already real, even if just to some degree—and perhaps as somehow already real more so than something else which also is yet to be?

These considerations intimate another quandary for supposing that pastness and (or) futurity pertains to the dynamic character of real existence as such—universalistically and at its most fundamental level. This quandary concerns how pastness and (or) futurity does relate, then, to reality's constituents and denizens.

That is, one alternative is to postulate that, as real existence continuously renews itself, it indeed does so utterly universally—that is, such that its dynamic character is, as it were, universe spanning, without regard for any distinctness or individuality on the part of its various diverse constituents and denizens. On this approach, distinct or individual existents and phenomena are real just insofar as they partake in reality's all-encompassing, universal existential procession. This sort of approach is sometimes called *Occasionalism*. On this approach, reality *in toto* is unremittingly de- and re-inventing ("re-anewing") itself.

One variant of occasionalism supposes that this occurs momentarily, instantaneously, or at least vanishingly quickly. Instances of reality's supplanting itself, accordingly, are incapable of quantification.

Occasionalism, though, may also be supplemented with the prior notion of real existence as graded or fuzzy—perhaps even such that instances of reality's supplanting itself are incapable of quantification in the weaker sense of not being amenable to any precise or exact quantification. On such an approach, reality's deinventing and concomitant reinventing of itself occurs gradually, or at least gradedly, rather than instantaneously.

Reality in effect fades away even while it is brightening anew. Reality's Occasionalistic procession is metaphorically more akin to the twinkles of a star than the staccatos of a strobe light, to the swellings of an ocean wave more than the beating curtain of a rain-front sweeping across the landscape, to thunder's roar more than the tick-tick-tick of a clock.

Contrary to Occasionalism, however, we commonly think of particular natural existents as each being real upon its coming-to-be and until it ceases-to-be. That is, natural existents are not as such continually deinventing and reinventing themselves. A natural existent, rather, lasts or persists in real existence for however long it indeed lasts or persists.

There, of course, does seem to be natural existents which come-to-be and cease-to-be, if not instantaneously, then at least astonishingly quickly—for example, certain subatomic particles, a lightning flash, some people's mood shifts. But, there also seem to be natural existents which in reality exist for some time—for example, an automobile, a Sequoia tree, the Empire State Building. There seems even to be natural existents which have already existed for thousands, even millions or billions of years.

Natural existence, as we commonly think of it, thus includes an extremely wide diversity of sorts of real existents—for example, quarks, insects, elephants, trees, mountains, planets, stars—which persist in real existence for hugely diverse periods of time, ranging from the unimaginably brief to the cosmically long.

On the other hand, Occasionalism (whether of the instantaneous sort, or of the fuzzy-smudgy sort) is not necessarily incompatible with a doctrine of persistent particulars, or substances. Occasionalism addresses the character of reality's dynamicism as such. A substance doctrine may do so as well. A substance doctrine, however, may instead relate to the lawfulness, or at least orderliness, of reality's dynamic procession—that is, to whether reality's dynamical character (even if it proceeds Occasionalistically) does also allow or provide for a meaningful notion of persistence, particularity, or substance.

3.2. *Synchronicity and Asynchronicity*

Chapter 3.1 indicated some ways one might attempt to depict real existence as itself a (dynamically) temporal process. One imagines real existence in its entirety continually leaving unreality of the pastness sort in its wake while forever straining against an horizon of unreality of the futurity sort. Another tries imagining reality's procession accommodating a patchwork of real existents, each having its own persistence ranging from the astoundingly brief (for example, Planck Constant phenomena) to the incredibly long (for example, stars, and cosmos traversing photons). For every existent, though, it is still the case that prior to

its coming-to-be it is not yet real, and subsequent to its ceasing-to-be it no longer is real.

The temporal concepts *synchronicity* and *asynchronicity* also seem pertinent to the fundamental nature of time. In virtue of their temporality, we typically suppose, real existents or phenomena may be synchronous or asynchronous with respect to one another. Or, conversely, real existents and phenomena are temporal existents and phenomena partly in virtue of their various synchronicities and asynchronicities with respect to one another.

The etymological root of these notions, *syn* + *chronos*, means 'along-with in time' or 'joined with respect to time'. Concordantly, we sometimes think of synchronicity as a being-in-sync (with one another) and asynchronicity as a being-out-of-sync. This seems especially apropos circumstances involving motions or other natural processes—for an in-sync case, for example when two runners begin running together and proceed at the same pace, or when two clocks "keep the same time."

Arguably, though, we could explicate these examples using the temporally neutral language of concurrence and nonconcurrence. We might say that the two runners serially concur (remain side by side), or that movements of one clock's mechanisms (for example, the positionings its "hands") are systematically concurrent with those of the other clock's mechanisms (for example, its changing digital display).

Indeed, we could explicate them in unambiguously static (atemporal) terms. The runners' in-sync-ness could be a matter of their being side-by-side at each time-when constituting a segment of static time. Similarly, our clock's in-sync-ness could be explicated as a systematic correspondence between how each "shows the time" at each time-when of their operations.

In a block universe, however, same-timeness is thus derivative from temporal order or sequentiality—for example, with respect to a preternatural faux-temporal dimension or line-of-time(s). Whereas, the temporal order of natural existence instead is partly established by the synchronicities and asynchronicities among its denizens. In an authentically temporal universe, in other words, synchronicities and asynchronicities contribute to establishing temporal ordering, not *vice versa*.

Arguably, too, temporal synchronicity surely means something more than concurrence with respect to an hypothetical time-line-segment, or than just conjoint presence in real existence. Synchronicity seems, in particular, to differ from other (non-temporal) sorts of concurrence in at least one respect: Distinct existents and phenomena can

exist or occur at the same time whereas they, for instance, cannot exist or occur at the same place.

Temporal concurrence (synchronicity) thus seems to connote a sameness lacking in other sorts of concurrence. Temporal concurrence as strict temporal sameness is called *simultaneity*. Consequently, we shall see in this subchapter that certain issues—both psychological or experiential, and naturalistic or scientific issues—concerning simultaneity are centrally important to understanding the nature and investigating the reality of time.

Concerning the intelligibility of place-sameness, already classical philosophers debated whether distinct existents can completely "intermingle" or "interpenetrate," and so occupy the exact same space—the exact same location, or volume of space. A key issue in this debate, though, is whether in potential such cases (for example, dairied coffee, sweetened tea) two existents are indeed occupying the same space; or whether, instead, a single new existent has emerged (for example, latte, sweet-tea). Or, consider bleaching and cleansing a shirt. Are two distinct phenomena occurring in the same place (the shirt fabric); or is a single process occurring which yields a dual result (a whiter-clean shirt)?

Some philosophers (for example, some Platonists) do consider logical or cognitive concurrence to imply strict sameness. When we say that two arguments have the same logical form or two people are thinking the same thing, on such a view we mean this in the strictest sense. This sort of concurrence, however, does not pertain to natural existence as such. Moreover, it seems more reasonable to suppose that this sameness is a conceptual abstraction and not characteristic of any real existents themselves.

Whereas, one might argue, the sameness of temporal concurrence is a real aspect of our (temporal) universe. When two people are thinking the same thing at the same time, this latter (temporal) sameness, unlike the former (intentional or cognitive) sameness cannot be parsed as a mere resemblance or an abstract comparative-sameness between their respective thoughts. The temporality of the one person's thought, according to the proponent of temporal same-timeness, is not merely similar (or dissimilar) to another's. Either the two thoughts occur strictly at the same time, or else they do not.

Aristotle (we shall see in Part II) goes so far as to argue that, for any given hypothetical slice of nature's unceasing procession, the same time obtains everywhere throughout the universe. Each real constituent or denizen of such an universal slice-of-nature is therefore existentially

simultaneous with every other one. Howsoever much two such existents may differ in spatial location, material constitution, or other aspects of natural existence, they do not differ temporally at all but are entirely the same in that respect.

On such a realist approach to same-timeness, accordingly, existential concurrence of distinct things is fundamentally a matter of same-timeness. My siblings and I are fellow participants in reality's procession, whereas Tyrannasaur Bob and I are not, because my siblings are alive at the same time I am, whereas T-Bob is not.

These last examples, of course, are easily explicable from a block-universe perspective—as due to my siblings and I, but not Tyrannasaur Bob and I, occupying fourth-dimensionally concurrent space-time coordinate blocks. Mere existential concurrence, however, is typically not of much interest to us. The sorts of natural existents and phenomena whose synchronicity or asynchronicity are typically most relevant to us are dynamically conceived motions and processes.

I may not care, for instance, whether other automobiles are on the streets concurrently with my automobile. What surely does matter to me, though, is whether any are moving through a certain intersection when I am. Similarly, I may not care who is participating in a hundred-meters sprint concurrently with my friend. But it very well might matter to me whether there is a fair start (the runners start simultaneously) and who crosses the finish line first, or if instead there is a tie because more than one runner crosses the finish line simultaneously.

In the previous examples as well, the mere facts that I have siblings and that I do not live in the era of dinosaurs are likely not to hold much, if any, significance or interest for me. Whereas, the experiences and activities and feelings that my siblings and I have shared (and potentially will share in the future), and the lack of any need to be wary of encountering an ornery Tyrannosaur, are of great significance and interest to me.

As in the case of pastness and futurity in Chapter 3.1, our notions pertaining to temporal synchronicity and temporal asynchronicity thus seem especially and most saliently entwined with our thinking about (natural) processes and motions, including our thinking about real existence as itself dynamically proceeding.

Jean Piaget is one who considers (temporal) synchronicity's special (conceptual and experiential) relationship with motion integral to our thinking about time. More precisely, Piaget maintains that how we think about (even perceive) time involves an interlaced web of tempo-

ral concepts, and various other concepts pertaining to such phenomena as motion and distance; and he understands this conceptual web to be, while related to our experiential transactions with natural existence, mainly a cognitive developmental achievement. Piaget's work (akin to McTaggart's in the philosophical domain) was pivotal to the development of contemporary psychologistic studies of time and temporality.

Piaget's work also raises interesting issues regarding time's relationship to motion, indeed regarding temporal procession as such. Piaget gives the following example from his experimental studies of children's temporal awareness:

> if one gives a child two tunnels of noticeably different lengths, he will immediately be convinced that one of the tunnels is longer than the other. One then puts two dolls moving on rods into the tunnels, while the child is able to watch both the entrances and exits of the tunnels. One asks whether one of the distances to be traveled is greater than the other, and all children point to the longer tunnel. The dolls are then made to enter the tunnels at the same time and emerge from them simultaneously. Young children maintain that the dolls moved at the same speed since they came out of the tunnel at the same time. [Piaget, 204]

This example seems to support the notion of temporal cognition's developmental character by demonstrating that children do not think about time the same way adults do. The children conclude that the dolls moved at the same speed, despite the disparity in the tunnels' lengths, since they entered and exited the tunnels simultaneously; whereas a mature observer would, presumably, conclude that one must have moved faster than the other (while in the tunnels) in order for them to arrive at the exits simultaneously.

Piaget's analysis of this experiment, though, assumes that the cognitive adult's perspective is the correct one. To buttress this assumption, he claims that the children's inference that the dolls moved at the same speed demonstrates a confusion, indeed an inconsistency, in their thinking. He posits that clearly the children "do not maintain their view concerning the inequality of the tunnels" [Piaget, 204]. Piaget alleges, in other words, that the children now believe that the tunnels are equal in length despite previously recognizing that they are not. However, he provides no evidence for this allegation.

Piaget's analysis also assumes that when children do use a concept, it has the same meaning for them that it presumably has for matured thinkers. But perhaps, for example, 'the same speed' does not mean the same for them as it typically does for cognitive adults. Maybe for

them it in effect just means 'started and stopped at the same times' or, more specifically in this case, perhaps just 'each moved in such a way that they arrived at the exits together'. Whereas for an adult 'the same speed' connotes traversing the same distance in the same amount of time, or the velocity(ies) required for doing this.

This adult understanding of 'the same speed' indicates that this concept is not about distance or tunnel-length alone. Yet, Piaget's analysis of the children's thinking implies that it is. His analysis of what happens from the children's perspective imputes to them two beliefs:

(i) One of the tunnels is longer than the other one.
(ii) The dolls moved through the tunnels at the same speed (since they entered and exited them simultaneously).

Presumably Piaget holds that these two beliefs are inconsistent because believing (ii) entails believing the denial of (i)—that is, believing instead:

(iii) The tunnels are the same length

Believing (ii), however, does not entail believing (iii). Minimally, we would have to impute to the children the additional belief:

(iv) The dolls were inside the tunnels for the same amount of time (since they entered and exited them simultaneously).

But it is not indubitably obvious that the children in Piaget's experiment do believe (iv).

Suppose that, in the situation the children found themselves, the shorter tunnel contained more time, inversely proportionate to its length, and similarly the longer tunnel contained concordantly less time, also inversely proportionate to its length. It would then be possible for the dolls to traverse the unequal tunnels in the same total amount of time (and so exit them simultaneously) because the tunnels would in effect contain the same amounts of time for the taking despite their length differential.

Put differently, suppose it makes sense to think of time as coming in units, but not necessarily equivalent units. These constitutive units of time may, rather, come in differing sizes (lengths) compared to one another. In such a context, moreover, speed is then conceived to be a function of how many time units are taken to traverse a given distance.

But, if so, the children could readily maintain both (i) and (ii) consistently.

The crude idea would be that longer time units allow for a longer distance to be traversed per each time unit, and shorter time units dictate a shorter distance be traversed per each time unit. The doll in the longer tunnel took longer distance-strides, as it were, per each of its longer time-units. Consequently, it traversed its longer tunnel in the same number of time-units as exist, more compacted, in the shorter tunnel. It would be as if, paradoxically perhaps, time sped up in the longer tunnel (or, conversely, slowed down in the shorter tunnel) so that the two tunnels contained the same number of time units.

Piaget offers another experimental case, however, which seems to deepen the children's cognitive confusions and inconsistencies, and so purportedly demonstrates further the immaturity of their temporal awareness and related cognition. In this experiment, the tunnels are removed, so the children are able to observe the dolls' actual movements. The dolls again start simultaneously and stop simultaneously, but this time one visibly moves farther—traverses a greater distance—than the other. Piaget provides the following commentary:

> All the children agree that the dolls started at the same time, that the departures were simultaneous. However, they do not agree that the instants of arrival were simultaneous, for the moving dolls were not stopped at the same point. Then one asks:
>
> 'When this doll stops, is the other one still moving?'
>
> 'No, it isn't moving.'
>
> 'Then they stopped at the same time?'
>
> 'No, they didn't stop at the same time, because that doll is ahead of this one.' [Piaget, 208]

Since the children watched one doll moving farther and farther ahead of the other one, Piaget infers that they must no longer suppose (as they did in his first example) that the dolls moved at the same speed. Rather, he reasons:

> 'at the same time' is a phrase having no meaning for the young child, in the situation described … For movements of different velocities, with different points of arrival in space, simultaneity does not yet have significance. [Piaget, 208]

The children supposedly recognize that one doll moves faster than the other one, and that when the faster-moving doll no longer moves (stops)

the slower-moving doll no longer moves (stops) as well. But, whereas the children supposedly understood simultaneity in the previous case, according to Piaget's analysis here they do not. They do not take the dolls stopping concurrently to imply (temporal) simultaneity. Therefore, their statement "No, they didn't stop at the same time" is gibberish, Piaget concludes, since in this experiment same-timeness (simultaneity) evidently has no meaning for them.

But, one wonders *pace* Piaget, then why do they state this?

Once again, Piaget's analysis is not the only one. His analysis again imputes two beliefs to the children:

(a) One doll moved faster than the other one; and
(b) they did not stop at the same time (since one moved farther than the other one).

But, belief (a) in fact simply does not arise in Piaget's conversation with the children. He just assumes that they believe this. Contrary to Piaget's assumption, moreover, even many adult concepts (including temporal ones) are at the very least ambiguous. They do not always mean the same in different situations. Perhaps, then, the children may attach different meanings to 'at the same time' in different situations. For example, maybe they sometimes use it to mean *simultaneously with* whereas other times they use it to mean *after the same amount of time*.

In this experiment, accordingly, maybe the children in fact do believe that the two dolls stopped at the same time—contrary to Piaget's imputing belief (b) to them—in the sense of having stopped simultaneously while also believing, in their subsequent conversation with Piaget, that the dolls did not stop at the same time in the sense of having stopped after moving for the same amount of time.

In other words, the children's insistence "No, they didn't stop at the same time" need not entail a denial of the dolls' simultaneous stoppage. It may instead express a belief that the doll which moves farther must have taken longer to do so.

Contrary also to (a), then, the children might not believe that the one doll moved faster than the other one. Rather, they might be implicitly reasoning that in this situation it must have moved for a longer time in order to move the greater distance. As a result, the children believe that the dolls did not stop after the same amount of time, though they did stop simultaneously.

I have noted Aristotle's postulate of time's universal, all-pervading,

singular reality. Piaget in effect assumes this as well. Distances may differ. Rates of change or motion may differ. But time is everywhere uniform. Whereas, my alternative analyses hypothesize that the children do not share this assumption. They implicitly believe, rather, that time may pass, be taken, or in other ways operate differently for different existents in different situations—even for the same existent in different situations.

A belief in temporality's local malleability, plasticity, or perhaps just plain diversity, would thus explain the children's perspectives in Piaget's two experiments. This does not deny that aspects of their thinking may in fact be incoherent. But adult cognition and thinking, including about time, is often enough incoherent as well.

Ironically, Piaget's own ultimate reconstruction of children's purported thinking about time does recognize the legitimacy of the above sorts of alternative analyses of his experimental accounts of childrens' temporal cognition. Levin sums up Piaget's ultimate analysis of children's thinking at the cognitive stage exemplified in the above experimental situations as recognizing that the children do not

> distinguish between the abstract dimension of time and the events that occur during that time … When two events entail different speeds, the child considers the pace of time of the faster event to be faster itself … In the same vein, when two actions conclude with different amounts produced, the child attributes the longer duration to the event that accomplished more. [Levin, 50]

Even this summation, though, is not quite cogent. In particular, the first experimental case glossed previously—where the speed differential occurred within tunnels to block direct observation of the dolls' movements—would have needed to evoke the opposite supposition from the children to the first situation described here in Levin's passage. The pace of time would need to have been slower, not faster, for the (in fact) faster moving doll (so that it would take the same amount of time to transit its longer tunnel).

Nonetheless, Levin's main point here concords with the alternative analyses proposed above, that at those children's stage(s) of cognitive development

> time is not conceived to be a unitary, continuous, or uniform dimension. Each event has its own time scale with its particular pace. This pace is not even homogeneous since it may be accelerated or decelerated … [Thus,] when two events flow at different speeds the child is unable to locate them along a unitary common time scale. [Levin, 51]

And yet, Piaget insists that the children are logically confused, even inconsistent, in their thinking about the temporalities of the dolls' movements in diverse situations: "they fail to infer the logical relations between the various time concepts of succession, simultaneity, and duration" [Levin, 51].

Piaget maintains that time is denoted (or, at least, connoted) by a web of concepts disconnected from (or, only indirectly related to) perceptual experience as such. Temporal awareness, for Piaget, is entirely a cognitive endeavor. It requires "correct" assumptions and concepts, and "correct" logical analyses and inferences when supplied with pertinent experiential information.

Time itself thus consists, for Piaget, of such things as "a unitary common time scale." It is distinct from experiential awareness of such natural phenomena as distance and speed (though it is conceptually related to certain notions regarding these sorts of natural phenomena). Cognitive improvement with respect to time—"correct" temporal (cognitive) awareness—requires ("correct") cognitive distancing and abstraction from natural phenomena (and our outwardly experiential awareness of them) as such.

Attributing specific beliefs, assumptions, concepts, and reasonings to children is dicey at best. I do not know what or how Piaget's children in fact think or reason, much less to what degree they may properly be imputed certain beliefs, concepts, and cognitive assumptions. What I do consider likely, though, is that for these children temporality is still largely a raw, unquantified, prechronologic experience. Their thinking is more particular and situational, less generalized and rigid. Moreover, contrary to Piaget's perspective, this need not diminish nor invalidate their experiential and cognitive encounters with their (and our) world. There is even quite sophisticated reason to believe that, to some degree, an existent- or situational-specific conception of temporality is in fact correct and appropriate.

Thus, consider another sort of example. It is not a real world case study but a thought experiment, an hypothetical case. It is a well-know thought experiment, designed to illustrate such notions as *time-dilation* and *inertial frame* in Relativity physics.

We are, in particular, asked to envision a set of twins—individuals born very close to "the same time." As they mature, it is thus reasonable to consider them always the same age. Soon after one of the twins completes astronaut training, however, this begins changing dramatically. The one twin remains on Earth. The astronaut twin leaves on a

spaceship which is soon traveling at a substantial fraction of the speed of light; and she returns several (Earth) decades later. Her twin meets her at the landing facility (probably at baggage claim). Whereupon, our galactic adventurer discovers that while she was gone her twin aged (to dramatize the point) several decades whereas she aged only a few years.

What is happening here? Surely this is not because her twin waited for her at baggage claim the whole time.

Einsteinian Relativity states that mass increases and time dilates (stretches or, dynamically, slows) with increasing velocity. There is a mathematically lawful connection between the astronaut twin's high velocity for much of her journey (compared to Earth's motion and relative to the universal speed limit for motion in our universe, the speed of light) and her highly noticeable age differential from her sister. It would be overstatement, though, to characterize the conception of time this case-study exemplifies merely as existent- or situation-specific. Nothing is so simple in Relativity's universe.

The stipulation that the astronaut twin returns several decades after she left is an example of Terra-centricism. So far as the astronaut twin is concerned (objectively as well as subjectively), she arrived back on Earth only a few years after leaving. In a real sense, the notion that time dilated for her is a misnomer. This also is a Terra-centric description. Time did not stretch (dilate) for her so that she would age more slowly. She truly was gone only several years, even while several decades passed on Earth. How could this be?

The notion of an inertial frame is not Terra-centric. It has nothing to do with the perhaps regrettable fact that all of our physicists still reside here on Earth. I shall not attempt a technical explanation of the notion. Over-simplistically, an *inertial frame* is a certain state of constant motion relative to light-speed. The key point, though, is just that Earth occupies one inertial frame whereas the astronaut twin's spaceship occupies a different inertial frame.

Time (insofar as it is real) and nature's laws operate the same in, or in relation to, any given inertial frame. But there is no one, single, ultimate, absolute inertial frame. There is just a multiplicity of potential inertial frames.

Metaphorically, each (potential) inertial frame has its own "copy" of nature's laws. An observer located in one inertial frame may thus (within certain boundaries) articulate information concerning another inertial frame, though only in relation to some specific frame—her own, of course, being the simplest choice.

What this implies is illustrated by the fact that the twins were indeed differing ages (they were at different points in their human development and life-spans) when the space-traveling twin arrived back on Earth. Not, however, because they aged in different ways. Natural processes did not begin operating differently inside the space-ship as it sped up (relative to Earth). The Earth-bound twin aged precisely as she should have aged over the several decades of Earth-time. The astronaut twin aged precisely as she should have aged over the several years of Her-time. From the Earth-frame's perspective, time dilated for the space-ship. From the space-ship's ultra-fast (comparatively to Earth's) perspective, time compressed for Earth.

Neither description is correct. Or, rather, both are correct but each only in relation to its own inertial frame. If either twin had doubts about this, she need only consult their respective chronometers. The Earthly chronometer will indeed indicate that several decades have passed; whereas the spacely chronometer will indicate instead that several years have passed.

This malleability or relational multiplicity of time is one of (Special) Relativity Theory's distinctive claims. Another, it is typically asserted, is its denial of time-sameness (simultaneity). Stated in this general way, though, this claim seems just weird. The twins were at the space-port at the same time when the astronaut twin embarked, and they were so again when she debarked. But more lies behind Einstein's analysis of simultaneity than science.

The speed of light sets the speed-limit for motion in any inertial frame. Nothing in a given inertial frame can move quicker than light-speed. If there does exist something whose motion exceeds light-speed, it must always have done so (and will forever continue doing so). It could never occupy an inertial frame pertaining to, or capable of interacting with, our universe of light-speed delimited motion. But, how does this pertain to simultaneity, or its denial?

The Einsteinian analysis involves a fundamental philosophical presupposition: that a concept's meaning (and also its reference) derives entirely from the sort of activity or observational method established and employed to validate its usage. This thesis is termed *Operationalism*. Consequently, we can ascribe simultaneity to a pair of phenomena only if, and only insofar as, we can observe their simultaneity. If we in principle cannot observe this, the implication is not merely that we indeed cannot discern their simultaneity as such, or purely by observation. It implies, rather, that the very hypothesis that they are (or even might be)

simultaneous is meaningless or, it is sometimes said more dramatically, absurd.

Observing something requires receiving information from it; and no information can be conveyed quicker than the speed of light. Light might be incredibly very fast; but its speed is still finite. Therefore, we can never observe the simultaneous existence or occurrence as such of two distinct phenomena—even if we are precisely the same distance from each and the information announcing each is conveyed at precisely the same speed (for example, just in the form of photon emissions themselves). For, there must always be some time-gap between something's sending forth information concerning its existence or occurrence and the information's reception by an observer. From the information we finally do receive from each of the two phenomena, we may be said to observe each of them. But we cannot be said to observe the actual "when" of their hypothetically concurrent, mutual happening with respect to one another.

Why, though, should we accept the Operationalist presupposition to this reasoning? Suffice it for here that Operationalism is a debatable (and highly debated) thesis in philosophy. The thesis, moreover, does not merely imply a denial of simultaneity. Chapter 2 made a case that (General) Relativity Theory in fact denies the reality of time altogether. The Operationalist underpinnings of various alleged non-formal, non-mathematical implications of the theory provide further basis for making that case. Einstein himself states that

> we understand by the "time" of an event the reading (position of the hands) of that one of these clocks [hypothetically placed along the direction of something's motion] which is in the immediate vicinity (in space) of the event. [Einstein, 24]

The implications of Einstein's viewpoint here may be elaborated in two ways. For one:

(1) Time is nothing apart from the activity or means by which we take ourselves to observe it.
(2) We "observe time" only by observing certain readings on certain devices designated to be time-keeping devices.
(3) Therefore, time is nothing apart from certain readings on *et cetera*.

Or, we may elaborate Einstein's viewpoint as implying:

(1') Time is observable only as something comprised of certain readings on certain devices designated to be time-keeping devices.
(2') Only observable time is time.
(3') Therefore, time is comprised entirely of certain readings *et cetera*.

The only meaning we could assign to 'simultaneity' would, for Einstein, be just the notion of someone relating a single "reading" on some clock (or clockish device) to two distinct phenomena, or of someone observing two phenomena and recording the same time-keeping "reading" for both.

Simultaneity itself, in other words, could be nothing other (nor more) than, say, just occurrent "readings" on some time-keeping device in context with someone relating a single such reading to more than one phenomenon. In these terms, and taking into account Einsteinian Relativity Theory's Operationalist presupposition, the theory's denial of simultaneity reduces to the assertion, as Greene states it, that "there is no single, preferred, universal clock" [Greene, 78]. Indeed, Operationalism implies the more general thesis that all temporal phenomena, or temporal aspects of phenomena, are nothing other than certain ways in which we conceptualize certain information supplied to us by certain designated devices.

Another alleged implication of Relativity Theory's approach to time, though, is the seemingly more philosophically interesting conclusion that

> observers in different states of motion [inertial frames] will not even agree upon the time order of events in certain cases … [Indeed,] it is even possible for an event to take place in the "past" of one observer and in the "future" of another. [Morris, 156–157]

Suppose two observers, X and Y, and two events, A and B, are situated in equivalent inertial frames (their states of motion are equivalent). Suppose X observes A happening at a location of space he previously calculated to be 1,350 million miles distance from him. Concurrently, he observes B happening in a location previously calculated to be 810 million miles from him. Considering the speed of light (186,000 miles per second), X would compute that A occurred two hours before B occurred. Suppose Y, on the other hand, is situated conversely: 810 million miles from B and 1,350 million miles from A. If she were to observe the two events concurrently, she would compute (also conversely from X) that B occurred two hours before A.

In a way, there is nothing surprising about this outcome. Suppose that X and Y are familiar with one another. Every time one communicates with the other and the other responds (immediately), the round-trip communication takes eight hours. Supposing that they both use light-speed communication, they must be situated 1,080 million miles apart. Each signals the other immediately upon observing the two events (concurrently), and so eight hours elapse before each receives the other's (immediate) acknowledgment. They then could each compute that they observed the events "at the same time." They could compute even precisely the order (and time separation) each would have computed for the events.

However, they might also describe this scenario in a book they writing. In particular, since the book is about Relativity Theory, they might use it to illustrate, not only that time can expand and contract, but also that there is no neutral fact of the matter regarding the temporal ordering of natural events. If even temporal ordering is relative to observers, moreover, then surely same-timeness is as well.

Still, it remains true (and significant) that anyone anywhere in the universe can in principle (possessing the requisite information) calculate the relationship between phenomena anywhere in the universe, as well as how anyone else anywhere in the universe would calculate the same relationship. And this is the case even where observers are in different states of motion (occupy non-equivalent inertial frames).

Morris quotes Herman Minkowski, space-times' conceptual sire, as having recognized this from the outset. Minkowski noted, in particular, that

> neither time intervals nor spatial distances were invariant in relativity, but … [a]lthough observers in different states of motion will, in general, disagree about the times at which events take place, and about how widely they are separated in space [or in time], they will have no difficulty agreeing that the events have a given separation [relative positioning] in space-time. [Morris, 163]

On (General) Relativity Theory's space-time approach, of course, there is no past nor future. There is only (at most) sequential before and after. Morris' scare-quoting 'past' and 'future' in the previous passage I have been illustrating recognizes this point. But, even reparsed to intend just sequentially before and after, Morris' statement is misleading.

Relativity Theory states, for example, that our two observers are not in fact situated differently with respect to space (nor with respect to time) but with respect to space-time. Our two observers (X and Y) are

not spectating reversed, inconsistent dramatizations of pastness-and-futurity's linked procession. They are assigning space-time coordinates to events from different space-time coordinates of their own. And, while (presumedly) differing in the coordinates they assign to A and B, X and Y can recognize the (relativized) correctness of each other's assignment of coordinates.

Moreover, as Morris also notes (contrary to Greene's assertion above that there can be no preferred universal "clock"), Relativity Theory

> does allow one to define a *cosmic time* that can be applied to the universe as a whole … Cosmic time is the time that would be measured by an observer who was moving along with the average expansion of the universe. [Morris, 174]

This does not address directly the above concern regarding temporal orderings in a Relativistic universe. It does, however, compromise Relativity theorists' insistence that Relativity Theory has no room for (it entails the impossibility, even absurdity, of) universalistic—universally applicable and referential—temporal conceptions.

Setting aside that (General) Relativity Theory implies the unreality of time, one might posit that this cosmic time mentioned by Morris in fact is the reality of time, or at least is its primary realization in our universe.

Our expanding universe is not akin to an expanding cloud or bee-swarm. These material conglomerates expand with respect to space (and over time). Whereas, the universe's expansion involves space and time themselves expanding (or, rather, space-time itself expanding). Perhaps, then, same-timeness is not only conceptually sensical. Insofar as an observer adjusts her calculations to reflect cosmic time instead of her own inertially parochial time, the concept of same-timeness may indeed have universal meaning and application.

Most importantly, though, Morris' previous statement claiming the reversibility of temporal ordering again rests upon the Operationalist presupposition. If X concurrently observes A and B (and Y does likewise), how "long ago" each emitted (light-speed) information in X's direction (and likewise Y's) is a function of distance related to light's speed. A temporal realist, however, would see matters differently. Consider another, perhaps more illustrative, example:

Suppose that two trucks, marked 'A' and 'B' (indicating their departure depots), arrive at depot X at the same time and two other trucks, also marked 'A' and 'B' (indicating their departure depots), arrive at

depot Y at the same time as well. All four truckers drove at the same (constant) speed. The receiving clerk at arrival depot X knows that depot A is farther away from his depot than depot B. Hence, he calculates that the truck from A left earlier than the truck from B. The receiving clerk from the arrival depot Y, on the other hand, knows that depot B is farther away from her depot than depot A. She therefore calculates that the truck from B left earlier than the truck from A. Who is correct about which departure depot sent its trucks forth first?

Actually, this is an ill-formed question. It assumes that each departure depot sent forth its trucks at the same time. Both receiving clerks would be correct if indeed depot A sent forth its truck to depot X earlier than its truck to depot Y whereas depot B sent forth its truck to depot X later than its truck to depot Y. In this case, if the delivery trucks carried the same simple message (for example, 'my departure depot exists!'), not only might the receiving clerks at X and at Y have concluded a different departure ordering for the trucks each observed arriving. They might also have inferred a concordantly different order of existence regarding the departure depots themselves, or regarding the "events" of the trucks going forth with their existential information.

From a realist perspective, however, both clerks are mistaken. Upon trading the pertinent information concerning the trucks and their arrivals, the receiving clerks should have concluded that each departure depot sent forth its two trucks at different times. In particular, first A sent a truck forth toward X while B sent a truck forth toward Y; and then later A sent another truck forth toward Y while B did likewise toward X. The arrival clerks did not observe a single pair of events somehow sequentially related to one another oppositely with respect to the two clerks. They observed two pairs of events occurring at different times: first one pair of events, each resulting in information going forth toward the arrival depot more distant from it; and then later another pair of events, each resulting in information going forth toward the arrival depot closer to it. Or, they observed a pair of existents which persisted from the first pair of sending forths until (at least) the sequentially later pair of sending forths. This is why the clerks concurrently each observed its pair of truck arriving together.

A realist would render a similar analysis of the previous example of two observers (X and Y) concurrently receiving light-speed information regarding what each initially thought was a single pair of events (A and B). Their initial assessments did not in fact pertain to the existential ordering of the two events but to the order in which each sent

information forth in each observer's direction (or else, to two different sequentially ordered pairs of events occurring, however, in a single pair of locations with respect to X and Y).

The reference in these two realist analyses to "a realist" does not, however, mean only a realist with respect to time. The analyses could have been rendered by a static, space-time, block universe, anti-time-realist existential realist. The key point, however, is that the analyses could have been rendered by a realist with respect to time—that is, by a proponent of a dynamic conception of natural existence and(or) of time's reality. Morris thus summarizes Relativity Theory's primary conceptual pronouncement regarding time this way: "What special relativity does imply is that whatever time is, it is not a substance that 'flows' at an even rate throughout the universe" [Morris, 157].

Actually, though, whether or not the notion that time may be both locally malleable (or situationally dependent) and yet universal (or cosmically singular) makes sense, Relativity Theory in fact renders any general claims or conclusions regarding just time as such improper. Thus, consider a couple final examples (thought experiments) proposed by J.B. Kennedy. The examples take into account (*pace* the astronaut/earthbound twins example discussed earlier) that, as a matter of Relativity Theory fact, any given inertial frame thereby determines the condition of rest for contents (or denizens) of that inertial frame, so that all other (different) inertial frames are in motion relative to it (or, relative to any observers "at rest" in that inertial frame).

For a mundane illustration, to observers waiting on a train station platform, a run-away train seems to speed past them (and to do so, say, at 90 miles *per* hour); whereas, to passengers seated on the train, the train station seems to speed past them (and to do so at the same 90 miles *per* hour). Or, to a race-car driver, another race-car traveling alongside it seems stationary while the race-fans in the bleachers seem to blur past; whereas to the race-fans it is the two race-cars that seem to be moving at such a blurring speed.

Kennedy's examples also take into account the fact that increasing relativistic speeds entail (relative) space contractions and not just (relative) time dilations (and mass increases). The examples also suppose cases where the inertial difference between two frames is large enough so that significant observable time dilations (and space contractions) occur. Thus, in the case of two space ships (A and B) originally built to identical specifications passing each other in empty space at a substantial relativistic speed differential, if the pilots were able to measure the

length of one another's ship and somehow also to observe one another's shipboard chronometer, then in such a case:

> Spaceship A will find that spaceship B's lengths are contracted and hours dilated … [but a]ccording to [spaceship B's] rulers and clocks, spaceship A is contracted and slowed … [Hence,] spaceship A is shorter than spaceship B *and* spaceship B is shorter than spaceship A. Hours on spaceship A are longer than those on spaceship B *and* hours on spaceship B are longer than those on spaceship A. [Kennedy, 31]

But, insofar as hours on spaceship A are longer than those on spaceship B, hours on spaceship B are thereby shorter than those on spaceship A. This example seems, in other words, to illustrate that according to Relativity Theory time in any given inertial frame is *both quicker and slower* than (or, is both contracted and dilated compared to) time in a different inertial frame.

This conclusion regarding the nature of Relativistic time, however, misstates the matter (as would the companion conclusion regarding the general nature of Relativistic space). In particular, it is imprecise to state, as Kennedy does, that hours on spaceship A are longer than those on spaceship B and hours on spaceship B are longer than those on spaceship A. Rather, in Kennedy's example, hours on spaceship A are longer than hours on spaceship B *relative to* (or from the perspective of) B's inertial frame and hours on spaceship B are longer than hours on spaceship A *relative to* (or from the perspective of) A's inertial frame. Accordingly, it is rather the case that time is slower on spaceship A (than on spaceship B) and quicker on spaceship B (than on spaceship A) *relative to* (or from the perspective of) B's inertial frame, whereas time is quicker on spaceship A (than on spaceship B) and slower on spaceship B (than on spaceship A) *relative to* (or from the perspective of) A's inertial frame.

In a way, the only general claim or conclusion regarding time allowed by Relativity Theory is that any specific claims or conclusions regarding time must always be relativized to some inertial frame. Even then, however, it in fact is improper for any putative such claims or conclusions to pertain just to time as such. To see this, consider a second example Kennedy proposes to illustrate Relativity Theory's conceptually (indeed, logically) peculiar character.

Time's (or hours') relationship to the two spaceships (A and B) in Kennedy's first example is no more logically peculiar than the mundane case where observers on a station platform consider themselves stationary and the train to be speeding past them, even while the pas-

sengers settled comfortably into their seats on the train think of themselves as the stationary ones and the train station to be speeding past them.

Of course, train passengers do not typically think this way; but this is because typically they experience additional phenomena which we associate with "being in motion"—accelerations, decelerations, swayings and bumpings on the train track, and the like. Consider, though, the cinemagraphic technique of displaying scenery as moving past the window of a stationary prop-car to effect a sense in the viewer that the car is moving through the country side. Kennedy's second example, however, seems to resist such a straightforward logical resolution.

Suppose that instead of two spaceships we have a very incredibly fast automobile and a garage whose door slams shut the instant an automobile fully enters it—the instant the rear edge of an automobile's rear-end crosses its threshold. Kennedy notes that, according to Einsteinian Relativity, a mass specified to move at 85 percent the speed of light (relative to some "stationary" observer) will contract approximately 50 percent (compared to its length were it equivalently "at rest"); and he supposes that, relative to the garage's inertial frame (or, as measured by someone "at rest" in the garage's inertial frame), *the automobile is consequently shorter* than the length of the garage.

Given these suppositions, it seems logically to follow that were the automobile unable to stop prior to contacting the back of the garage, the following sequence of events may occur:

1. The front of the car enters the garage.
2. The rear of the car enters the garage.
3. The garage door slams shut.
4. The front of the car is consumed by the resulting impact-explosion.
5. Ultimately, the rear of the car is consumed by the explosion.

Kennedy also supposes, however, that when instead the garage is measured relative to (or, from the inertial perspective of) the automobile (so that the garage rather than the automobile is taken to be moving 85 percent light-speed) *the garage is shorter* than the automobile.

Given this supposition, however, it seems to follow that the sequence of events would instead be:

1. The front of the car enters the garage.
2. The front of the car is consumed by explosion.

3. The rear of the car enters the garage.
4. The door slams shut,
5. while the rear of the car is consumed by the explosion.

Here, the differing implications concerning the relative lengths of the automobile and the garage (depending upon which inertial frame is designated to be the stationary one) seem to have real consequences in the real world. They seem to imply a real difference in the actual sequence of events as the automobile and the garage (with its instantaneously slamming door) interact with one another.

In particular, Kennedy's hypothetical case claims that the explosion reaches (and consumes) the rear of the automobile before it is completely inside the garage (and the garage door is able to close immediately behind it) relative to the automobile's inertial frame—and so as observable by someone "at rest" in that inertial frame; whereas, the automobile's rear end instead does cross the garage's threshold (and the garage door closes) before the explosion reaches and consumes it relative to the garage's inertial frame—and so as observable by someone "at rest" in that inertial frame.

Surely, though, these are two entirely incompatible sequences of events. Surely, either the automobile fully crosses the garage's threshold (and so the garage door does slam shut) prior to the explosion consuming the entire automobile or else it does not, regardless of any measurements or calculations someone might make from the perspective of some inertial frame.

Kennedy's example does not, however, demonstrate the falsehood of realism, nor the truth of a form of subjectivism. The flaw again lies, rather, in the logic of his analysis.

The seemingly incompatible sequences of events, recall, supposedly follow from the fact that the respective lengths of the automobile and of the garage are such that the garage's length when measured relative to the automobile's inertial frame is contracted compared to its length as measured from within its own inertial frame, and conversely concerning the length of the automobile; and these comparative differences are such that the garage is shorter than the automobile when the two are measured relative to the automobile's inertial frame, whereas the automobile is shorter than the garage when the two are measured relative to the garage's inertial frame.

To arrive at the alleged (incompatible) implications of these divergent comparative inertial-frame measurements, however, Kennedy in effect

presupposes a neutral observer who imposes a single time frame (or temporality) even while also contemplating the automobile's and the garage's comparative lengths relative to each of their inertial frames. In other words, Kennedy's analysis leaves out the fact that, not only is length contracted in each inertial frame when measured relative to the other inertial frame, but also time is dilated.

Very crudely, the garage might be shorter when measured relative to the automobile's inertial frame but the garage-time available, as it were, for the front (and every point along the length) of the automobile to traverse that length is dilated (and conversely). Insofar as the automobile is longer than the garage, it in a sense has more time to enter it front-to-back; whereas the automobile's shortness compared to the garage entrains with it less time for its full length to enter the garage.

In somewhat more technical and proper terms, Kennedy ignores Relativity Theory's doctrine of *spacetime-interval equivalence* between inertial frames, which implies, for instance, that

> measurements of distances and durations depend on speeds, since they will contract or dilate, but the spacetime interval between two particular events is always the same: everyone who measures and calculates will find the same number. [Kennedy, 57]

But, then, what would the order of events be in Kennedy's example? What are this example's implications regarding the exploding automobile as it relates to the garage's length and its hair-triggered quickly-closing door?

The best way to answer this question is to note another flaw in the logic of Kennedy's analysis. In particular, upon its front crashing into the back of the garage (if not already upon its first contact with the garage's threshold and atmosphere), the automobile will no longer occupy a distinct inertial frame from the garage's. Actually, neither the automobile nor the garage will occupy its previous inertial frame but both will now occupy a new inertial frame in effect delineated by their interaction. Arguably, this new inertial frame (or the ongoing sequence of ever-newer inertial frames) as it emerges and evolves during the automobile's interactions with the garage (and its resident matter) should be the one consulted to specify the preferred perspective from which to determine the resulting sequence of events.

The most proper order of events, in other words, would be just whatever order occurs as the automobile's interactions with the garage proceed to their own conclusion. More precisely, perhaps, it would be

the order which a Relativity physicist would describe as stochastically most likely were she fully cognizant of all pertinent data regarding the motions and energies of all of the particles involved in the automobile's and garage's interactions as, as it were, their inertial frames collide.

Even from a temporal realist perspective, however, the discussion earlier in this subchapter suggesting the possibility of real temporal malleability and some implications of (Special) Relativity Theory discussed more recently, at the very least, surely do complicate how one might depict real existence as itself a (dynamically) temporal process. I shall not pursue this here; but, rather, will close this subchapter with Dainton's comment in this regard:

> [Would] relativizing existence [be] any less odd than relativizing simultaneity? Those who dismiss any connection between temporality and existence may be inclined to think it is, but exponents of dynamic models of time do not share this view; anyone who believes that time and existence are intimately connected might be very tempted to suppose that if simultaneity is frame-relative, existence must be too. [Dainton, 272]

3.3. *Temporal Pace and Measurement*

To abstain from mathematics, in Plato's estimation, is to refuse knowledge, to remain a complicit victim of opinion's uncertainties, ambiguities, and errors. Inscribed above the gate to his Academy was the warning: *No one shall enter who does not know geometry*. There is no definitive evidence anyone was actually barred entry on this basis, though legend accords it a role in Epicurus setting up philosophical shop outside Academy walls and in the controversy over Aristotle's admittance. Nevertheless, the sign at least purports that the mathematically uncaring and unlearned shall assuredly never enter the inner garden of Platonic truth and knowing.

Modern science's adoption of mathematics as the undisputed language of nature and its laws thus culminates a long tradition rooted in Plato (and his arithmophile precursor, Pythagoras). Often overlooked, however, is Plato's belief that mathematics is uniquely practical as well. Plato prized mathematics also for its utility and effectiveness in yielding the best knowledge available to us regarding the natural objects of human experience.

Arguably, an impartial and worldly-wise consultant may best adjudicate discrepancies among individuals, or even resolve a sole individual's

perplexities and uncertainties. Plato held that, when what needs adjudicating is the true character of a natural object of sensory awareness, mathematics is uniquely qualified to serve as such a consultant. A sensory object's true character is most determinable insofar as it may be related to a metric, measure, or limit (*metron*, *peiros*); and, according to Plato, mathematics, in its practical application, is the science of measure. Perhaps time, insofar as it is real, is such an "object."

But, how does relating a natural object of sensory awareness to some metric pertain to its true character? Suppose you and I disagree on the relative heights of two Sequoia trees. You claim that Sequoia A is taller than Sequoia B, whereas I claim that Sequoia B is taller than Sequoia A. We do agree, however, that we can reasonably adjudicate our disagreement by comparing the results of measuring the trees with respect to a common metric (and, of course, from some preferential perspective, or inertial frame). We unroll an incredibly long tape measure first along one of the tree's trunk, and than along the other's. According to the tape measure, Sequoia A is 298 meters tall and Sequoia B is 279 meters tall. In virtue of our prior methodological agreement, your claim (that Sequoia A is taller than Sequoia B) is correct, whereas my contrary claim is incorrect.

In this example, the science of measure has adjudicated our disagreement regarding the relative heights of the two Sequoias. How, though, does our tape-measuring procedure pertain to the true relational character of the trees? Arguably, the procedure pertains to the trees' true relational character just insofar as each tree's tape-measurement pertains to that tree's own true character (in this case, its true height). In what sense, then, is 298 meters the true character of Sequoia A's height, and likewise regarding the 279 meters measured as Sequoia B's height?

A common answer to this question points to how the unit of measure utilized by this procedure (the meter) itself pertains to the true character of nature. The meter is currently defined as "the length of the path traveled by light in vacuum during a time interval of 1 / 199,792,458 of a second" [Robinson, 105]. Insofar as the tape measure's arithmetically sequential meter markers accurately concord with this standard meter-length, it may reasonably be said to measure the true height of each tree inasmuch as its unit of measure derives from nature itself. Can something similar reasonably be said regarding time? This subchapter examines this question, and several important related issues.

Nicole d'Oresme introduced the image of the *clockwork universe* in 1377 (A.D.). This image, that the cosmos is a sort of primal clock,

may be associated with the Platonic-Neopythagorean tradition. Inspiration for it is found, for example, in Plato's *Timaeus*. The image, though, easily seduces us to exaggerate Plato's association of mathematical conceptions with nature, including the cosmic motions he designates in *Timaeus* to pertain to time. Imputing to Plato the image's intimation that the universe's astronomic organization and motions may be thought of as a prototypically designed, archetypally flawless, natural embodiment of chronography would have been anachronistic, though, already in Oresme's day.

Plato does maintain that time exists in virtue of certain cosmic motions. In *Timaeus* he designates the day, the month, and the year to be time's principal parts, measures, or limits. Indeed, the primary meaning of Plato's conceit that *time is the moving image of eternity* is that, since time exists in virtue of cosmic motion, considered apart from or (conceptually) prior to its moving the cosmos is atemporal. Without cosmic motion, in other words, there is only eternity (the absence of all time). Time is thus a consequence ("image") of the atemporal mathematical-*cum*-geometrical organization of our cosmos when it moves.

Plato conceives the natural universe to be a huge but finite sphere. Earth is located at its center. "Above" Earth's spherical surface is the Heavens, which contains all of the Heavenly bodies we observe moving relative to Earth—Sol, Luna, Mercury, Venus, Saturn, Mars, and Jupiter, and the stars and their constellations. Attempting to account for these Heavenly bodies' observable motions relative to one another and to Earth, Plato divides the Heavens into "outer" and "inner" and then subdivides the latter into seven "spheres of motion" at certain mathematical intervals, assigning the Heavenly bodies to the various spheres and attributing to each an appropriate direction and "swiftness" of motion.

This system of unceasingly (circularly) moving spheres and (or) Heavenly bodies constitutes Plato's moving image of eternity. Plato posits that

> the creator … resolved to have a moving image of eternity, and when he set in order the heaven, he made this image eternal but moving according to number, while eternity itself rests in unity, *and this image we call time*. [Jowett, Tim. 37d–e]

Time, then, is the Heavens as thusly "set in order" and "moving according to number." Plato explains further:

> For there were no days and nights and months and years before the heaven was created, but when he constructed the heaven he created them also. They are all parts (*mere*) of time, and the past and future are created species (*eide*) of time. [Jowett, Tim. 37e]

The heavenly order of spheres, accordingly, "were created by him in order to distinguish and preserve the numbers of time" [Tim. 38c], and therein "were necessary to the creation of time" [Tim. 38e].

For terrestrials such as ourselves, the most significant of the Heavenly bodies are Sol and Luna, inasmuch as

> the night and day were created [generated (*gegonen*)], being the period of the most intelligent [Sol's] revolution. And the month is accomplished when the moon has accomplished her orbit and overtaken the sun, and the year when the sun has completed his own orbit. [Jowett, Tim. 39c]

Though these three (the night and day, the month, and the year) may be designated time's principal parts, accordingly, time's parts include all of the Heavenly bodies' orbital cycles (*periodous*) and their (proportional) relations to one another insofar as these are discernible "because of number"—although, Plato avers, human beings have failed to delineate and name all of these [Tim. 39c]. Plato concludes his most pertinent remarks:

> there is no difficulty in seeing that the perfect number of time [is the one which] fulfills the perfect year when all the eight revolutions, having their relative degrees of swiftness are accomplished together and attain their completion at the same time, measured by the rotation of the same and equally moving. [Jowett, Tim. 39d]

This "perfect number of time" has been dubbed Plato's *Great Year*.

Plato maintains that the Heavenly motions are perfect, unchanging, and unalterable. Each "sphere of motion" is a geometrically perfect sphere, and so each Heavenly body's consequent orbit is, too; and the relative location of each sphere is unchanging, as is the "swiftness" of each Heavenly body's motion. But, while these motions may be trivially said to keep time (since they just are time), there is no indication that Plato considers them (precisely) measurable (precise) temporal measures as such.

The "parts" of time generated by the Heavens' motions range from the night-and-day (I shall say just 'day') to the Great Year. For Plato, then, the day is time's smallest (shortest, or briefest) part. It is defined as the period of Sol's revolution around Earth, where 'period' means episode or occurrence. It is not itself (temporally) measured by anything other than itself.

But, couldn't a Greek sundial, sand clock, or water clock keep track of shorter periods of time, and so consequently also function as a "measure" of Sol's revolutions? We shall see that ancient clockish devices of these sorts were in fact simply not utilized in such a manner, for this sort of purpose. Their own temporal meaning—presuming they had any—would depend, rather, upon their processes' mathematical relationships to the day in any case.

In the sundial case, any increments marked on it would in fact represent different lengths of time each day. There is, after all, a reason it is dubbed the sundial. Sand clocks, in turn, were highly inaccurate and variable devices. And, while a well-made water clock was highly accurate (consistent), no attempt at consistent or standardized design was ever undertaken. There was no notion that a given water clock represented a certain particular length (unit, part, measure) of time as such.

The "numbers of time" preserved by the Heavenly motions, rather, are just the number of times each consequent time-part reoccurs, as individuals and groups find various uses for keeping track of how many days or months or years pass—for instance, associating certain activities with the passing of a certain "part" of time or of a certain number of a certain "part" of time, or for commemorative or other historical purposes. Whereas, the "perfect number" of Platonic time is the number of revolutions the outermost sphere ("the circle of the same") makes betwixt identical positionings of all the Heavenly bodies relative to one another.

This is not to say, of course, that Plato's time-parts—for example, the day, the month, and the year—cannot also be utilized as measures (metrics) pertinent to diverse temporal phenomena. It is entirely intelligible on Plato's conception of time to assert such things as: I have been traveling for 2½ days. An archon is elected every twenty months. Phaedon lived to be 68 years old. The celebration lasts the entire day. I will drive my old chariot for one more year. But, such assertions would mean something significantly different for Plato than they would for us.

In Plato's context, 'I have been traveling for 2½ days,' for example, might mean: I began my journey two sunrises ago and it is midday again. 'An archon is elected every twenty months' might mean: An archon election is held the day of the twentieth new moon since the previous election. 'Phaedon lived to be 68 years old' might mean: 68 summer solstices occurred between Phaedon's birth and his death; or perhaps: Phaedon died upon the 17th Olympiad since his birth.

Concordantly, were Plato asked: How long is a day (or, a month; or, a year)?, he might respond: A day is the time measured out from one sunrise to the next (or, a month is the time between two successive new moons; or, a year is the time marked by each summer solstice).

The modern Western notion of the clock derives, rather, from Medieval monasticism. In particular, St. Benedict regularized daily Christian prayer sometime in the sixth century by codifying

> seven precise times for prayer as part of the rules for the liturgical day of his monastic order … During the following centuries this schedule … spread across Europe along with the powerful Benedictine order, and it was later adopted by other monastic orders. [Barnett, 46]

The ringing of bells alerted the monks to each canonical hour. Engineering the mechanical clock then began sometime during the mid-13th century.

When the Medieval equivalents to our modern English word 'clock' were first applied to these devices, however, is unknown. Tellingly, though,

> our word *clock* derives from the word for bell in medieval Latin (*clocca*), as well as in all of the European languages: *clok* in Middle English, *clocke* in Middle German, and *cloque* in Old French. [Barnett, 47]

In the 14th century, architecturally large clocks were incorporated into cathedral towers across Europe. Astronomical clocks were also devised, concerning which

> the two early [Astronomical] clocks about which we have the most detailed knowledge were not simply timepieces—these amazing machines were also mechanical models of the universe. The [Giovanni de'] Dondi instrument [completed in 1364], with its geared mechanisms for the movements of sun, moon, and planets and its perpetual calendar for all fixed and movable religious festivals, was really only incidentally a timepiece. It was a planetarium powered by clockwork. [Barnett, 80–81]

Here, then, we see the actual basis (rather than Plato) for Oresme's image of our cosmos as clockwork-like.

Actually, though, ours is not a clockwork universe. William Paley appealed to its clockishness to demonstrate the existence of an Intelligent Designer of all nature. As with all (classical and contemporary) arguments from design, however, Paley's suffers from the fundamental flaw that it demonstrates equally that any such Designer must not be a very good one—or, at least His job performance in the design area of His portfolio fails to meet expectations for an absolute, perfect Being.

Had Paley's Designer gone into clock-making, using the cosmos as His own prototype for all clockwork-like movements, He'd be out of business by now.

To clarify this perhaps surprising (to many people) point, suppose you wish to purchase a clock. You are in a shop specializing in electrical and electronic devices. You notice a somewhat clockish-looking device. It has a number of different sorts of moving mechanisms on its surface, however; and which (if any) indicate time is not evident. Maybe they all do, in various ways. Maybe some do, and some do not. Or, maybe none of them do.

After inspecting the device for some time, you identify several surface mechanisms as possible time indicators. But a number of questions arise. For example, how should you characterize and interpret how each mechanism indicates time, or what it is that each indicates concerning time? How useful is each mechanism; or, in what way(s) or circumstance(s) could you effectively use each of them? Are some or all of them discernibly, coherently, regularly related to some or to all of the others; or, are they all relationally incommensurable? Is one of them superior, more useful, predominant with respect to the rest; or, are they indeed just so many diverse movements (some or all of which might or might not be relationally commensurable to one another)?

Maybe you should just ignore such a complex, obscure, duplicitous device and search the shop for a more pellucid, practical, univocably clockish apparatus. But, the device fascinates you. You observe it, and various of its surface movements, for a while and decide to reflect on it more before deciding whether to purchase it. Several days pass. Frustrated yet still intrigued, you return to the shop to inspect the device further. To your consternation and dismay, however, your inspection only deepens your puzzlement.

You had formulated some notions and hypotheses concerning, for example, how several of the surface mechanisms' movements would be useful for coordinating various activities; and how at least several of the mechanisms relate to one another and may comprise, as it were, a single coherent clockish master-mechanism—indeed, wherein one of these movements stands out as itself potentially dominant with respect to the others. As you inspect the device this second time, however, you realize that none of the mechanisms even relate to one another as you had inferred from your previous observations. They all seem to have gotten out of sync, or else their "sync" has changed.

Indeed, you verify a troubling fact you thought you observed during

your previous visit: that certain mechanisms do not even move uniformly during a given episode of their repeating patterns of movement, nor from one repetition to the next. You realize upon further inspection, too, that for a number of the applications you had in mind several movements seem more-or-less equally useful despite discernible differences between them. Surely, you finally conclude, the apparent clockishness of the device is either illusory, or else is quite sloppily designed and(or) rendered.

This scenario dramatizes a few of the impediments to positing ours to be a clockwork universe. For example, a ready candidate for a clockishly dominant mechanism to our universe is one we might think of as a year-marker. Actually, however, there is not just one such cosmic mechanism. A number of (more or less equally useful) recurring phenomena may be (and have been) taken to mark the year.

Plausibly, the notion of the year first pertained to Earth's seasonal climatic cycles and the human need for food (by growing it, gathering it, or hunting it). For instance, the most significant environmental event in ancient Egypt was the annual flooding of the Nile River. The Egyptians' primary year marker, accordingly, was the annual reappearance of the star Sirius (the "Dog Star") after its transit behind the sun. This phenomenon—which marked the beginning of the Sothic year (named after Sirius' companion deity, Sothis)—harbingered that the Nile will soon flood [Steel, 11]. In the southern hemisphere, Sirius' counterpart as a popular celestial year marker is the Pleiades, so that in fact: "In many native tongues of South America, the words for 'year' and 'Pleiades' are the same" [Steel, 36].

Recurring phenomena involving Sol have also been used to mark the year. Two sorts of phenomena have seemed especially useful. One is its relative location (angle, azimuth) to one's own earthly location as it rises. Another is its seeming role with respect to the equinoxes and the solstices. For example, although the intended functionality of the Stonehenge monolith arrangement continues to be investigated, there is general agreement that it pertains to one or both of these two sorts of solar phenomena.

Perhaps the most common (or, common-sense) notion of the year for moderns (post-Copernicans) is the time it takes Earth to complete one revolution around the sun. Notice, though, the conceptual shift here from the year as something marked by each recurrence of a particular celestial, solar, or other appropriate phenomenon to the year as a certain length of time delineated by a certain phenomenon which

takes that length of time to complete—or, which upon completion has "measured out" that length of time.

There are interesting conceptual differences between these two ways of thinking. For one, the former more readily invites tolerance and acceptance of multiple sorts of years—for example, to serve various religious, political, survival (agricultural, climatic) needs or purposes—by a given group in a given locale. For another, the former also invites less attention to the passage of time (or the progress of the year) as such.

The purpose of a year (or an other "part" of time) marker pertains more to a sequence of certain activities, or to one primary activity, prompted by the marker—for example, preparing for the Nile's flooding and whatever other subsequent activities Sirius' reappearance incited on the part ancient Egyptians. Arguably, in other words, the Egyptian Sothic year was less about such temporal bookkeeping tasks as keeping track of how old the pharaoh was, or measuring how much was accomplished during the previous year, or scheduling when what is to be done during the new year; and more about commencing a certain sequence of activities to prepare for and then take advantage of the subsequent benefits of the Nile's flooding for Egyptian agriculture and society.

Or, for a different example, there is a real difference between sunrise prompting a person to feed the chickens, collect the day's eggs, milk the cow, work in the field until the overhead sun prompts him to rest and eat lunch, and so forth; and sunrise instigating a person to recall and commence fulfilling his preset schedule for the day, or to calculate and plan out how much he can accomplish (and when) as the day passes.

This shift from the year as marked by phenomena prompting human activity to the year as a certain length of time, or organizational period, is subtle. I do intend to portray it as a shift in emphasis or attitude, and not as something entirely new which has entirely supplanted what was before. This shift may make it even more evident and significant, however, that indeed not all years are equal. There are different ways to determine even just the length of time we crudely associate with Earth's orbiting the sun; and they do not all yield the same results.

For example, it currently takes 365.2596 days for Earth to orbit the sun if this is measured from one perihelion (the Earth's nearest orbital point to the sun) to the next. This is partly because the perihelion point shifts (precesses) slightly each year, and it adds up to a full day every 57–58 years [Steele, 27]. The perihelial year changes, even if minutely, each recurrence. Determining Earth's orbital time by reference to the

equinoxes and(or) solstices yield different results altogether from the perihelial year, and also differ compared to one another.

Currently, 365.24237 days lapse between successive vernal equinoxes. The time from one summer solstice to the next, however, is 365.2416 days. From one autumnal equinox to the next requires 345.242 days; and two winter solstices are separated by 365.2427 days. These differences can amount into the minutes each year. Moreover, these time spans also are not entirely constant.

Steele computes, for one example, that the time from vernal equinox to vernal equinox is approximately a half-day longer now than in Jesus' day. If we look to the fixed stars for temporal guidance, they take yet a different time span of 365.25636 days to return to their (approximate) positions relative to Earth of a (sidereal) year earlier [Steele, 380–381].

But this appeal to days in expressing the length of a given sort of year is in turn itself problematic. The length of the day differs, for example, with respect to Sol and with respect to the fixed stars. The latter (sidereal) day is approximately four minutes shorter each former (solar) day. Moreover, the length of the former (solar) day itself changes during each Terran solar orbit. Because of Earth's non-circular solar orbit and the tilt of its spin axis,

> the duration of a day chang[es] in a cyclical fashion as the year passes. Only four days each year are really twenty four hours long (one in mid-April, one in mid-June, one in early September, and the last in late December). Some are longer and some are shorter [than 24 solar hours]. [Steele, 365]

Further, because of Luna and the massive (Jupiter and Saturn) and near-Earth (Mars and Venus) planets, and other factors, Earth's spin rate is continually slowing. Hence, "far in the past there were [for example] more than 400 days … in every orbit of our planet about the Sun" [Steele, 19].

It is perhaps obvious, finally, that the conclusion of one day and the onset of the next may itself be (and has been) marked in various ways. Obvious candidates include sunrise, sunset, or solar midday. Midnight was proposed as the internationally standard day marker only recently, at the 1884 International Meridian Conference in Washington, D.C. [Steele, 23].

Here, yet another consideration intrudes. My mention of hours in my above remarks concerning the day must be qualified to intend *modern* hours—hours as conceived in virtue of mechanical clocks (and their technological successors). Arguably, no temporal concept has shifted

more dramatically in modernity than the hour. Prior to mechanical clocks, the hour was not even conceived to be a fixed time-length.

An early device for dividing the day into segments dates to *circa* 1500 BC in Egypt. The device is roughly 'L' shaped, though oriented with the longer leg laying on the horizontal. In the morning the horizontal ground-leg is oriented away from the sun's rising location ("away from" as it protrudes from the vertical end-piece). As the sun ascends, the vertical end-piece casts a shadow over this horizontal appendage. Upon the sun reaching its midday zenith, the device is turned around so the end-piece then casts its shadow from the direction of the sun's descension and setting.

Lines are engraved on the horizontal leg to divide it into six segments. As the sun ascends (and then as it descends), the edge of the shadow cast by the shorter vertical leg thus depicts the progress of "time" relative to the six "hours" marked on the horizontal leg. The hour-lines are unequally spaced in the attempt to make the hours roughly equal, since the end-piece's shadow moves more slowly the higher Sol ascends and then more quickly as it descends [see Barnett, 28].

An obvious feature of this early clock (and of course its successor, the sundial) is that it only works during the daytime, and when Sol's luminance is not too obscured. A different sort of clock also seems to date to ancient Egypt:

> Of all the devices invented to count time when and where the sun wasn't available, *by far* the most successful and widely used was the water clock, or clepsydra. [Barnett, 36]

Barnett observes, however, that the water clock was not used—even later on by our Medieval monks—to segment the night, nor to mark or else to "keep" time as such. Its precision and consistency was relied upon primarily as a dedicated timing device—for example, to signal the end of a soldier's guard duty, or to alert the monks that a certain nighttime prayer-hour has arrived. Allegedly, Plato engineered one to function in effect as an alarm clock to waken his Academy each morning [Barnett, 37]. It was used, in other words, to prompt some activity (or sequence of activities), not to "keep time."

A more significant feature of the Egyptian proto-sundial is that its hours move more quickly or more slowly day to day. The device segments daytime into the same six hours whether daytime in fact lasts for fourteen modern hours or just for eight modern hours. For this rea-

son the segments are termed *temporary hours*. Only the mechanical clock made it possible to reconceive hours to be a certain quantity, and one equally applicable during nighttime as well as daytime.

For most of the history of time technology (including for some time after the mechanical clock was developed), mathematically quantitative and other (modern) clockish concepts and devices affected relatively few people in their daily lives, or in their thinking and attitudes regarding time—though, "by the early seventeenth century there was a well-established profession churning out timepieces for an eager and ever-broadening clientele" [Barnett, p. 94]. Even then, however, clock technology still had a long way to go: "People knew that [the timepieces] were inaccurate because they all rang at different times" [Barnett, 94]. People still deferred to the sundial for "correct" time information—and for resetting their mechanical clocks again and again (for example, each "high" noon).

Yet another important feature of the Egyptian hours-marking device is the highly local character of its information. For example, the very idea of reducing time differences to a defined set of temporal longitudes (time zones) was not fully articulated and implemented until the International Meridian Conference of 1884. Until then (and not everywhere by any means even then), mechanical clocks themselves were set according to local solar time:

> each [city, or locale] set its clocks not to a broad man-made zone of time as we do, but to the true sun time of its particular spot on the earth's surface. If you traveled to another city, you found out what time it was when you got there. [Barnett, 127]

To be sure, thinking of the day as a local phenomenon is in a way a more accurate way of marking it because, insofar as it relates for example to Earth's and Sol's circadian dance, the day in fact is a local phenomenon. But, on the other hand, as our conception of the day became more discrete and standardized, clock technology also advanced (and *vice versa*). Consequently, the modern day, and the twenty-four modern hours comprising it, are now marked far more precisely. Nowadays, even everyday consumer watches purport to indicate time down to the second, and other clockish devices far more precisely still. Consequently as well, though, the modern day and hour are now only very loosely related to Sol and its luminance.

Another salient mechanism on the face of Oresme's purportedly clockwork universe consists of Luna's changing phases and positions

relative to Earth-based observers. The lunar (or Synodic) month derives from the former (the repeating pattern of Luna's phases). It must be distinguished from the calendrical month, which is a particular segment of a certain sort of year. The calendrical month is a remnant of failed attempts to relate lunar months to the year in some commensurable manner (though calendrical months have been related as well to certain celestial phenomena or patterned motions, for example of the zodiac); but it nevertheless is a distinct phenomenon.

Pertinent considerations regarding the Lunar month as a clockish phenomenon are probably by now predictable to the reader. For instance: The moon takes a little more than 27 days to orbit Earth, where the fraction past 27 days varies "depending upon whether one defines the orbital period according to the lunar equinox, or perigee, or some other juncture" [Steel, 29]. The period between two equivalent phases of the moon for a terrestrial observer, moreover, is yet a different length of time, principally due to Earth's concurrent movements in relation to the sun. For example:

> On average the time between full moons is close to 29.5306 days … Due to the eccentricity (noncircularity) of the lunar orbit, the actual interval between successive full moons varies between 29.2 and 29.8 days … The variation in the interval between *new moons* can be even greater. [Steel, 30]

These current approximations are of course themselves changing, for example as Luna slowly recedes from Earth (by approximately one and one-half inch each year) and as Earth's own orientations and movements continually change in various ways.

The question was posed earlier in this chapter whether time, like the height of a Sequoia tree, may itself be an "object" of sorts which is amenable to measurement, to being measured. How meaningful this question would be in Plato's classical context, we have seen, is unclear. Platonic time—as eternity's moving image—is in a way measured-out by motion, particularly by cosmic (Heavenly) motions of a countably recurrent sort. And, obviously one can relate notions denoting such motions to the temporality of diverse other phenomena. On the other hand, time—particularly in modern (Western) society—is not what it used to be in significant respects.

"The invention of the clock," Barnett remarks, "began a gradual, centuries-long transition from a perception of time as something rooted in nature to something which originates in the clock itself" [Barnett, 145]. Indeed, Rifkin observes that still, even today:

> Our Western concept of time … makes little sense to members of other cultures where durations are measured not by the ticking of the clock, but by the unfolding of environmental events or the ordering of sacred rituals. [Rifkin, 52]

Rifkin proceeds to emphasize two features of his point here. One pertains to the modern Western sense (reflected in my example of measuring the height of Sequoia trees) of what it means to measure something. The other pertains to a separation or abstraction (hinted in Barnett's remark) of measured-time from temporal phenomena as such.

Rifkin provides several examples. One is from a study of a group of African schoolchildren by P.M. Bell:

> When asked how long a two-hour bus journey had taken, some students thought it had taken ten minutes, others thought the journey had taken as long as five or six hours. [Rifkin, 52–53]

Rifkin proposes that this illustrates an highly intelligent and entirely functional cultural population who nevertheless "had no awareness of clock time as a way of measuring the duration of an event" [Rifkin, 53].

A second example further illustrates the parochial character of our modern conception of and approach to time and its measurement:

> In many traditional cultures, duration is measured by reference to specific tasks rather than abstract numbers. For example, in Madagascar, when someone asks how long something takes, they might be told that it takes the same time as 'rice cooking' … or the time it takes to 'fry a locust' … [Rifkin, 53]

Arguably, the pivotal achievement leading to the modern conception of time keeping and measurement was Galileo's articulation of the *principle of isochronism*, according to which "the length of time (period) of a pendulum's swing depends on how long the pendulum is and not on the width of its swing" [Barnett, 99]. So long as a given freely-swinging pendulum remains in motion, in other words, the periodicity of its movements remains constant regardless of the arc-degrees of its swing.

The idealizing requirement that it be 'freely-swinging' is crucial; but the principle's implications are clear. The periodicity of a given freely-swinging pendulum's movement is a (constant) repeating phenomenon, and its quickness is proportional to its length. In the world of the pendulum, shorter is quicker; longer is slower.

The challenge Galileo's principle posed to clock design and engineering was substantial, inasmuch as:

> If clocks were to be successfully regulated by one of nature's laws, then a sort of sanctuary for the free play of nature would have to be created within the patently unnatural confines of the clock's apparatus. [Barnett, 100]

The payoff, however, was equally substantial: having a means of, in principle, generating an invariant portable unit of time measuring-out, or time-keeping. As clocks became more reliable, the time(s) they measure-out also became increasingly more standardized; and as they became more precise, the time(s) they measure-out became increasingly more determinate.

We now associate these four characteristics—invariance, portability, standardization, and determinacy (or precision)—so strongly with the nature of time that it is difficult for us to think of time any other way. We presume, for example, that every hour is exactly the same as every other hour (invariance); and this implies that what an hour is is the same for any natural phenomenon and for every clock (standardization) and for anywhere we may use a clockish device for local time measuring (portability). We presume as well that the more precisely we (mathematically) specify what an hour is—that is, the more fine-grained we render the hour by specifying it (invariantly, standardly) in terms of some number of tinier and tinier units of time measurings-out—the more accurately we are describing the true character of every genuine hour (determinacy, precision). Finally, insofar as these units are derived from nature itself—for example, vibrations of cesium atoms—it seems reasonable to posit that time is indeed an "object" amenable to the science of measure, analogously to vertical spatiality (height) in my opening example in this subchapter of the Giant Sequioas.

It may be over-dramatic to state, as Barnett expresses a common theme among chrono-historians, that time is no longer "something rooted in nature [but] something which originates in the clock itself" [Barnett, 145]. Still, it does seem natural to us today to think of time in terms of the many instruments and devices we presume observe it, keep track of it, and which we slavishly obey in numerous ways every day.

We wear watches, many of us all day every day. Lacking a watch, or at least a nearby clock, we can feel disoriented, even anxious. We "check the time" with a certain habitual frequency. Throughout the day, we wonder and calculate such things as how much longer this will take, or how long until that happens; how much longer will I need to do this, or until I need to do that. We carry appointment books and time-planners (electronic or antiquarian), and always know the day and date.

If you're an Aristotle scholar, you should know when he was born and when he died, when he was a student in Plato's Academy and when he was Alexander the Soon-Great's tutor. If you're a cosmologist, you should know the speed of light, how long ago the Big Bang blew, and how long until (maybe) the Big Crunch shall craunch, or else until the Big Fizzzle fades the final remnants of our cosmos to nothing instead.

Contemporary life is suffused with time. We are obsessed with it. We are drowning in it. We may feel a remorse, an ambivalence, about time because (as Aristotle says) time destroys all things, inasmuch as every thing wastes away in time [see *Physics* IV.221a30ff. & 222b20ff.]. But we may also despise it because we have slaved ourselves to it. We recognize our temporal subjugation and obsessiveness; and we prefer to direct our anger at time, and maybe the social conditions which mandate our addiction to it.

Arguably, though, what we despise here is not time as such but "civilized time." This is the time which has suffused our world since infancy and suffocates us in adulthood. This is the time we most dream of fleeing, transcending, or at least just ignoring.

Maybe our discomfort with what I have termed civilized time (that is, fully modernized time with respect to invariance, portability, standardization, and determinateness) vents a deeper sense that there is something horribly wrong with it, as though it were a perversion of time, an affront to time, no more authentically time as Mary Shelley's Frankenstein's monster was authentically human.

Life is not as neat and tidy as we increasingly, obsessively seek to pretend it is. Why, then, should time be as neat and tidy as we have tried to make it out to be, as our Frankentime pretends it to be? Maybe we feel disoriented when apart from the instrumentalities of its civilizing parental presence because we only then are confronted with our idolatry, with the falsity of the sham reality we have erected through those instrumentalities.

Of course, Mary Shelley's Creature ended up proving himself to be the most human of us all, a mirror in which natural humanity sees its own capacity for inhumanity; and he was not at all the true monster in her story. The natural humans who failed to perceive the Creature's obscured yet very real humanness were the ones lacking in true humanity.

In Frankentime's case, however, the reverse seems to hold: the common presumption is rather that civilized time is the authentic time,

the pristine truth of time revealed and made manifest by science and technical invention, the consummation of time's unobscured essence. Maybe the real truth about time, though, is then the reverse of the Creature in Mary Shelley's story as well.

Still, generalizing on Plato's conception of time as cosmic (Heavenly) motions, surely it is reasonable to think of the natural universe as the Great Clock inasmuch as it does (for Plato, as for us) in a way keep track of time; and, since what it therein keeps track of is nothing other than its own processes and movements, surely it also is reasonable to suppose the Great Clock of nature (*pace* my preceding critique of the clockwork universe image) to be consummately and unfailingly accurate. Inasmuch as it keeps track of time by means of the very processes and movements which in reality are time, what would it even mean to allege it to be in any way inaccurate in its track-keeping of time?

And yet, in the case of actual (mechanical, electronic, atomic, etc.) clocks, we tend to associate accuracy with determinacy, or precision. A really accurate clock is also a really precise clock.

In what way, though, should an accurate clock be precise? In a sense, precision indeed just amounts to accuracy, or correctness. For example, a precise translation of Aristotle's Greek would, in this sense, be one which accurately translates Aristotle's Greek. Similarly, a clock does a precise job of keeping track of time insofar as it is not inaccurate.

In a deeper sense, however, precision seems to imply or require more than just "accuracy." In this second sense, a precise (English) translation of Aristotle's Greek would be one which does not merely render it into acceptable, appropriate English according to standards and practices as these have been established by classical scholars; rather, it would be one which indeed attempts to capture and articulate in English every syntactic detail and semantic nuance of Aristotle's prose insofar as paleographers and the translators are able to identify and discern them.

We may express the main point here by distinguishing between more *coarse-grained* and more *fine-grained* renderings or approaches. In these terms, two translations may be equally "accurate" as English renditions of Aristotle's text; but one might be more fine-grained—hence, more precise—in its approach than the other. For another example, a realist or a pointillist painter using a thinner brush is likely to produce a more fine-grained—hence, more precise—painting than one using a thicker brush.

Similarly, we suppose that a cesium clock is more precise than a quartz clock, and that a quartz clock is more precise than an old-

fashioned spring or escapement clock; and at least one reason why we suppose this is because in each case the former is more fine-grained in its track-keeping and subsequent rendering of time.

Yet, the fact that we continually seek to produce more and more fine-grained clocks and suppose that a more fine-grained clock is a better (more "accurate") clock does not entail that time itself is, as it were, fine-grained. Indeed, perhaps time is in reality not granular at all.

On the Great Clock of Nature conceit, the nature of this Great Clock is such that we are able to produce out of various of its materials and in conformance to its laws instruments which we suppose are temporal track keepers and which approach their assigned job and render their purported results in more coarse-grained or more fine-grained manners. This does not imply, however, even that nature's own processes or movements are in reality themselves granular at all—much less that, if they are, they are always inherently fine-grained and never coarser-grained.

For a crude analogy, as a life-long diagnosed myopic, I have at times mused about the possibility that my so-called short-sighted visual acuity in fact more accurately "sees" what is actually out there, more correctly discerns the way things in fact are, in physical nature; whereas, individuals with purportedly "good" vision (or, for that matter, me when wearing prescription lenses) are the ones who are miss-seeing reality—*albeit* in a manner which is highly useful, advantageous, perhaps even more aesthetically pleasing.

But, even a weaker notion of the natural universe as the Great Clock (that is, as clock-ish, even if not always, in every way, nor impeccably) has conceptual difficulties. If it is a mistake to identify what actual clocks keep track of (namely, time) with their temporal track-keeping activities, why is it not also a mistake to do so in the case of the Great Clock? Why should we suppose that the natural universe, just by keeping track of its own processes and movements, thereby keeps track of time?

The answer, for Plato, seems clear: Time's "parts" are nothing other than the Heavenly bodies' motions; and time surely is nothing other than its own parts. Even in Plato's case, however, there may be a confusion between time as something *generated by* the Heavens, and time (as Plato himself had at first asserted at the outset of his account of time [Tim. 37e]) as equated with the Heavens, or Heavenly motions, themselves.

Clearly, for Plato, if the Heavens did not exist then time would not exist; and were the Heavens no longer to exist then time would no longer exist. Any naturalistic account of time, presumably, would have to maintain something like this. When a fire generates ambient heat, the existence of the heat depends upon the existence of the fire. Arguably, though, it would be a mistake to equate the ambient heat with the fire itself.

The more fundamental issue, however, is why what cosmic motions (or even just natural activities and processes generally) generate just by virtue of their doing what they naturally do is properly dubbed time. Why are they temporal motions, activities, and processes? Or, in Plato's case, too, why are the "numbers" they generate temporal numbers?

Aristotle, in contrast, conceptually links time to motion generally (and not just certain particular motions—for instance, the Heavenly motions) by arguing that a person's awareness of time's passing requires an awareness of motion. In contrast, Bostock rejects Aristotle's argument because, he claims, "we can perceive rest as well as movement" [Bostock (1980), 166]. Both the physiology of perception and much of our own experience, however, make it highly questionable whether we can perceive rest in the absence of any and all motion whatsoever. Indeed, *contra* Bostock's claim, it is unclear what an awareness of time's passing would or could even be in the absence of any and all motion, especially if this includes the inner motions of our own thoughts and mental processes.

Piaget's experiments and his interpretive analyses of them, for example, also agree at least with the general thesis that for us time is linked to motion. Further, insofar as our concern is with the temporal reality of our universe—independent of how human may happen to perceive it—the notion *absolute rest* is just a non-starter.

In any case, a close association of time with the sorts of natural existents which we most commonly think and talk about in dynamical ways (that is, motions and changes) does seem to play a large role in our thinking and talking about time, or temporal reality as such, in dynamical ways—for instance, when we characterize time or temporality as itself proceeding, passing, or moving in some way, and perhaps doing so quickly or slowly, or sometimes faster and sometimes slower.

When discussing whether the dynamical reality of time is explicable in terms of pastness and futurity, accordingly, it seemed appropriate to talk about the existential journey or the ongoing existential process to which the natural constituents of reality are subject, in which

they participate—in virtue of which natural existents are not merely either real or not real, but they also come-to-be real and cease-to-be real.

And, in the case of processes or motions themselves, a presumption of temporal dynamicism seems implicit in such common notions as that of natural processes or motions taking more and more time the more or "longer" they continue; of their speeding up or slowing down, or occurring at a faster or a slower temporal pace, than before—and perhaps even pausing "for a time"; and of their taking more or less or the same time (occurring at a faster or slower or the same temporal pace) than similar ones had on previous occasions.

Additional pertinent examples here include such common notions as that of two distinct processes or motions taking the same or a different (either more or less) time to occur; of their occurring at the same or a different (faster or slower) temporal pace; of one of them even pausing "for a time" while the other one continues; and the notion of their doing any of these things compared just with one another, or with yet another process or motion.

Arguably, though, such common notions as these are explicable in terms of a static account of time. Still, they do play a large role in our typical thinking and talking about time as dynamical in character, and so to our typical understanding of temporality.

3.4. *Presentness, or the Present*

A familiar brainteaser asks: If a tree falls in a forest and no one is there to hear it, does it make a sound? The question exploits a latent conflict in how we think about what philosophers sometimes call *sensible qualities*. It seems to force us to abandon one or the other aspect of our thinking about sensible qualities, or else somehow to resolve the conflict.

On the one hand, we commonly think of sensible qualities as real features of the surrounding environment; but, on the other hand, we commonly think of at least certain sensible qualities as existentially dependent on our sensory organs and mechanisms. Thus, when the tree crashes to the ground and someone hears it "crash," surely it is the tree that is doing the crashing, and also the "*crash*"-ing [sound]. On the other hand, sounds are just as surely distinctly auditory phenomena whose existence depends on the presence, minimally, of an auditorily capable being with functioning auditory sensory mechanisms.

A "no" answer to the brainteaser seems tantamount to denying that sensible qualities are real features of the surrounding environment. Whereas, a "yes" answer seems tantamount to denying their dependence on appropriate sensory mechanisms. Alternatively, a common philosophical response would instead answer "yes and no"—that is, in one respect "yes," but in another "no."

One way to elaborate this answer distinguishes two correspondent sorts of qualities. One sort are indeed real features of the surrounding environment. Whereas the other sort are indeed dependent on sensory mechanisms. Another way distinguishes between the sorts of (physical) causes or conditions which typically yield certain sensible qualities in the presence of appropriate and functioning sensory mechanisms, and those sensible qualities as such.

These two variants of the "yes and no" approach need not be incompatible. The notion of *sensible qualities* is, like the notion *properties* briefly discussed in Chapter 1, a philosophical conceit meant to facilitate expression and discussion. The notion is rooted in the idea that we constantly perceive things in the world around us in certain ways which we closely associate with the sorts of sensory modalities, organs and mechanisms, we possess and use.

Visually, we perceive, for example, the colors and shapes of things (more precisely, colored and shaped things) and their seeming lightness or darkness, depending on the luminance (or its lack) in our visual medium at the time. Another example, of course, is audition's (hearing's) constancy in making us aware of—in presenting in or for our experience—sound(s).

Sensible qualities are sometimes characterized in a converse manner—for instance, as the ways in which things we perceive persistently appear to us through, or in virtue of, our (five) sensory modalities and sorts of sensory mechanisms. In these terms, the proposal of two correspondent sorts of properties can be clarified in at least two ways.

One way to characterize further the dual-qualities proposal claims that the relationship between the two sorts of sensible qualities is more than a consistent, one-to-one correspondency. Rather, it in fact amounts to a more-or-less equivalency. I say 'more-or-less' equivalency to allow for distorting or other altering affects due, for example, to the surrounding medium or the condition of an individual's pertinent sensory apparatus. Still, the general idea is that the ways in which we sensorially experience things do accurately characterize those things them-

selves as well—even when they, as it were, are all alone (unperceived). The dual-qualities, in other words, are more akin in fact to identical twins.

The sense and intent of this variant of the dual-qualities proposal is easiest to convey in the case of our sensory modality of vision. That is, this variant distinguishes between a sort of sensible quality which arises in the course of, which comprises the immediate contents of, our visual experiences and a sort of sensible quality which indeed characterizes, or "qualifies," things in our perceptible (physical) environment.

One reason to insist on this distinction is to account for the affects of our visual medium or of other pertinent factors and conditions on the way we might see something—or, conversely, on the way something might visually appear to us—on a particular occasion. Indeed, a person can experience fully "real" visual phenomena without the environment stimulating her visual apparatus, so long as her neurological system is somehow properly stimulated.

The idea, though, is that—despite there being two sorts of (visual) sensible qualities adapted to two different sorts of existential environments (namely, visual experience as such and physical things themselves)—in both cases, we might say, red is not anything other than just red, blue is not anything other than just blue, and so forth. Were we able to directly perceive things and phenomena in our environment *sans* any visual medium and any physiologic and neurologic (bodily) visual mechanisms, in other words, our visual world would include precisely the same-appearing sorts of colors (and shapes, and any other visual sensible qualities) it does now.

A major difficulty with the identical-twins variant of the dual-qualities proposal is its *prima facie*, up-front implausibility in the case at least of certain sensible qualities. Sounds are an excellent example. For, this variant would have us believe that when our tipsy tree falls in the forest its impact with the ground indeed does generate a "*crash*"-ing sound, whether or not an auditory capable being is in the vicinity.

To be sure, the innumerable sounds presumably emitted or otherwise generated by various things (and their interactions) might become modified as they flit and fly about, and sometimes finally do interact with our auditory sensory mechanisms. Still, as in the case of vision and colors, the identical-twin-qualities variant implies that sounds of the actually-heard-sort are indeed "out there" before we experience them "in here"—and are "out there" even if no one ever experiences them at all.

Another way to characterize further the dual-qualities proposal does sharply differentiate the character of the two sorts of qualities. It thinks of sensible qualities as they arise in the course of, which comprise the immediate contents of, our sensory experiences in similar fashion to the identical-twin-qualities variant; but, what in our perceptible environment—or, what about the physical things which occupy that environment—correspond to the sensorial contents of our experiences may be very different in character. They might not, as it were, "look" like their appearances at all.

One of the more popular postulates for what in our physical environment answers to the same descriptive concepts or predicates that we apply to sensory appearances appeals indeed to some such notion as causal capacities—or, whatever about physical things provide them causal capacities—to stimulate or interact with our sensory mechanisms in ways which ("normally") yield various sorts or elements of sensory appearances (for example, colors, or sounds) under various sorts of conditions.

A major difficulty with this variant in effect pertains to the other side of the dual-qualities distinction than was the case with the identical-twins variant's difficulty. That is, one now wonders how colors-as-seen, sounds-as-heard, flavors-as-tasted, odors-as-smelled, and so forth, somehow do arise during or result from a process involving physical things and interactions which are not as such already characterized by qualities of those sort as such. If the actual "*crash*"-ing sound of the falling tree is not generated by the tree's impact with the ground, for example, then why should it somehow be generated instead by the bones and "drum" comprising someone's inner-ear and the neurologic pathways and systems joining these to a certain locale within her brain.

Time is not a sensible quality. You cannot see it, feel it, hear it, taste it, nor even smell it. Yet, akin perhaps to sensible qualities, it is not entirely contrary to common thinking to suppose that time depends for its existence on the existence of temporally aware beings—that, in a very real sense, ours would not be a temporal universe if it did not include such beings (for example, you and me). What seems contrary to common thinking in this regard is, rather, the subjectivist (or internalizationist) inference that time therefore exists entirely and only "in us"—that we effectively create time entirely *ex nihilo* within ourselves.

It does not seem entirely unreasonable, though, to wonder whether time exists for insects and fish, perhaps for gerbils and armadillos,

maybe even for very young human beings. These beings all live in the same natural universe as such temporally aware beings as you and I. They experience the same natural existents and phenomena by whatever means and in whatever manner they are sensorially equipped to experience them. They may even respond behaviorally to the same, or at least similar, stimuli (causal conditions), and in similar ways. Yet, one might wonder whether reality for them is experientially the same as it is for us, including in regards to its temporality.

Even in the case of human beings, Piaget's work with children (discussed in Chapter 3.2) may suggest that young humans are severely if not entirely lacking in temporal awareness, that temporal awareness is as such a developmental attainment. It might be argued, though, that Piaget's analysis has it backwards—that, insofar as younger humans are temporally aware, their temporal awareness more closely concords with natural temporality than cognitively more developed humans'. If modern humanity generally is less in sync with, more cognitively biased and revisionist towards, natural existence in certain respects (for example, as discussed especially in Chapter 3.3, its temporality), then perhaps so too is the modern adult compared to the modern infant.

A possible response to this line of thinking, though, is that it is just besides the point. The reality which it purports may be different for the insect, the fish, the gerbil, the infant human, and the adult human is the "reality" of their cognitive or other modes of awareness. Philosophically, the notion of reality as it "is" experientially for a certain being in fact refers rather to its appearances to a percipient, and not to its reality as such. Many features of the natural universe, however, may escape a cricket's or a gerbil's or an infant's notice and awareness; and others may simply appear differently to different sentient beings.

And yet, this perhaps obvious response seems too facile. A central figure in the development of temporal antirealism (or, subjectivism), Immanuel Kant, argued that:

> since all representations, whether they have for their objects outer things or not, belong, in themselves, as determinations of the mind, to our inner states; and since this inner state stands under the formal condition of inner intuition, and so belongs to time, time is an *a priori* condition of all appearances whatsoever. It is the immediate condition of inner appearances (or our souls), and thereby the mediate condition of outer appearances. [Christensen 1993, 74; from *Critique of Pure Reason* A34/B50]

Reality, according to Kant, is *for us* temporal due to the nature of human awareness and cognition. Time exists just in that a complete

description of the immediate content(s) or intentional object(s) of our own sensory and other mental processes necessitates it.

In sum, according to Kant, we are incapable of perceiving or thinking about particular things or phenomena otherwise than as temporal existents. Time (or temporality), however, is not a real feature of our natural (physical) environment but an (unavoidable) artifact or "condition" of human awareness and cognition.

This does not do justice to the subtlety and intricacy of Kant's analysis. Still, I wish to raise here an additional consideration to those I raised when discussing internalization approaches to time in Chapter 1.

Consider, again, audition and its distinctive sensible quality, sound. Suppose (as in earlier discussion of the dual-qualities proposal) we distinguish between sound as what someone hears (as a distinctly auditory phenomenon), and the causes and conditions responsible for someone hearing a sound; and suppose we maintain indeed that, in the absence of a capable being endowed with auditory sensory mechanisms, the former could not exist or occur even while the latter still would. Still, one might ask, what does this imply in regards to this distinction when such a being is present and indeed does hear a sound? What does this imply regarding the relationship between an actually experienced auditory phenomenon and the causal realities and conditions responsible for the experience, or its auditory content?

From a subjectivistic perspective, the nonexistence of sound as such in the absence of a sentient being actually hearing a sound is reason to infer that a sound, when it is heard, is still distinct from its occurrent causal conditions—including the pertinent neurologic and other physiologic processes occurring in the hearer. For, from a subjectivistic perspective, a sensorialy and cognitively aware being's surrounding ("outside") environment includes her own body (her ear-drums, neural chemicals and synapses, and so forth) as much as it includes, for example, the toppling tree. But this, in turn, implies that sounds are as such never real features of the natural universe in which we live and perceive and think.

Arguably, sounds (like pains and tickles) do indeed have a distinctly subjective (as it were, inward-ly) experiential character. Vision, in contrast, is our quintessential sensory window on reality, our primary mode of outward-ly directed awareness of our universe's denizens, constituents, and phenomena.

From a subjectivistic perspective, however, the distinctly objective experiential character of visual sensory experience just marks it as the

most illusory, the most misleadingly appearance-bound of our sensory modalities. The rectangularly white paper-ish expanse decorated with variously curvilinear black letter-like figures you are currently seeing is in fact nothing other or more than the current immediate content of your visual awareness, just as the "*crash*" you heard last week on your camping trip was nothing other or more than a passing immediate content of your auditory awareness.

Indeed, a principal impetus for modern philosophy's subjectivist tendencies is science's conception of natural existence, including the causal circumstances of sensory awareness itself, and this conception's patent divergence especially from ordinary visual experience.

The real universe of modern science is colorless, odorless, flavorless, and the like. Science also demonstrates that the proximate causes of visual awareness and experience are electrochemical and neurological. As noted earlier in this Chapter, you would see precisely what and as you are currently seeing so long as the same cellular and electrochemical mechanisms in your neurological system were stimulated the same way they are currently being stimulated as you (let us suppose) indeed are looking at and seeing a page of paper. It would equally seem to you that you are seeing a paperish object located a couple feet beyond your body, "out there" in front of your eyes. Nor is there anything scientifically exotic or physically peculiar enough about your neurological components and processes to suggest that they are not themselves as colorless, odorless, flavorless, and so forth, as the rest of natural existence.

And yet, experiential subjectivism seems akin to inferring that, since alternating current would not exist were it not for the pertinent electromechanical devices, alternating current is still not a real (physical) phenomenon now that such devices do exist; or that, since the images on your television screen or on a photograph would not exist were it not for the pertinent devices and processes, they still are not real but only "apparent" features of the natural existents which appear to display them (namely, the television, and the photographic paper).

On the other hand, in support of experiential subjectivism, it also seems peculiar to suppose that our universe indeed does include certain sorts of (real) features or phenomena (for example, colors, sounds) which, however, exist in it only because of certain sorts of complex mechanisms (for example, sensory, or neurologic).

The notion that time depends for its existence on the existence of temporally aware beings (so that such beings are in a real way respon-

sible for ours being a temporal universe) itself requires elucidation. In particular, what is it about time without which time would not be real but which, without temporally aware beings, would not itself be real? Or, turning the question around, what would be missing from reality if such beings did not exist? What would our universe lack (which it currently has), such that it would then not be a temporal universe?

As this subchapter's title indicates, the proposal I shall explore here claims that what would be most crucially missing is presentness. What our universe would lack is a (or, the) present; and, the proposal contends, without presentness (or, a or the present) there is no real temporality.

For instance, the proposal in Chapter 3.1 to explicate temporality in terms of pastness and futurity, or past existents and future existents, may as such strike some as incomplete; and similarly regarding the thesis in Chapter 3.2 that (temporal) synchronicity and asynchronicity presuppose a same-timeness and different-timeness (whether universal or, for example, in relation to a given inertial frame).

In the former case, one might argue, it is not merely the case that the past consists of existents insofar as they are sequentially prior to other existents in the order of natural existence, nor of existents insofar as they already have been (and no longer are) real; and likewise it is not merely the case that the future consists of existents insofar as they are sequentially subsequent to other existents in nature's ordering, nor insofar as they are yet to be (and not yet are) real. Rather, it is also and more perspicuously the case that past existents are prior to all those subsequent to now, or those which already have been real as of now; and, likewise, that the future existents are subsequent to all those prior to now, or those which are yet to be real now.

Similarly, one might argue that the time in virtue of which natural existents are or not synchronic is not merely some (same) time or other. Rather, (temporal) synchronicity or asynchronicity is always to be determined, first and foremost, with respect to the time it is now.

One might argue as well that fundamental aspects of Chapter 3.3's discussion of time as something which passes, and which may even be kept track of and measured, are likewise incomplete without proper references to now.

The notion sometimes used by philosophers for this "now-ness" is *presentness*, or *the present*. The foregoing point may thus be summarized as arguing that key temporal notions—for example, the past (pastness), the future (futurity), simultaneity, in- and out-of-synchness, temporal

passing (or proceeding)—cannot be entirely, perspicuously explicated without this notion.

But, what is presentness? How is it something more (real) than an insubstantial, arbitrary now-ness which amounts to nothing more than just an hypothetical some-time-or-other-ness? For, if this is all it is, it does not add at all to our previous discussions of temporality, and key aspects of it, in Chapters 3.1–3.3 after all.

The remainder of this subchapter will address three matters especially pertinent to answering this question: The difference, if there is one, between temporal presentness and just the "is-ness" of real existence as such; the difference, if there is one, between temporal presentness and just objectual presentness-to experience; and the notion that temporal presentness consists primarily in the so-called "specious present." Examination of this last notion will also raise important questions regarding the actual character and structure of human temporal cognition and, once again, its relation to real existence.

Temporal presentness must, first of all, be distinguishable from just the (real) existence, or "is-ness," of natural existents. The two may often, maybe even always, coincide. But, arguably, something's being real does not entail its being (temporally) present. And if, for example, the present may include unreal things, nor need they even coincide.

John McTaggart's putative account of time (discussed in Chapter 3.1) is a good example of failing to insure this distinction. From McTaggart's perspective, every existent (including putatively past and future ones) has its own presentness. Plausibly, McTaggart has in mind something like the temporal-sounding notion that every existent which ever was, is, or will be (real) has real existence just precisely when it indeed in reality exists. But the notion that every (real) existent has real existence just when it in reality exists in effect says nothing more than that, since something has real existence just insofar as it in reality exists, its real existence must coincide with its in reality existing.

This, however, turns temporal presence (or presentness) into just a sort of existential self-presence. In other words, it amounts just to an assertion of reflexive ontic (self-) identity, which may be asserted and embraced even by someone (for example, an Eleatic) who denies the reality of time.

To be sure, real existence, or "is-ness," and presentness do seem closely related. We oftentimes do think of real existents as what presently exists (and *vice versa*). Insofar as we think of existents which already have been real (past existents) and existents which are yet to be real

(future existents) as therein not real, it does seem plausible to suppose that between or in addition to these two existential conditions is a third condition wherein, on the one hand, existents are real while, on the other hand, they contrast with past existents and with future existents in regards to time so that they are appropriately identified as present existents.

In terms of the dynamicist notion that past and future pertain to existence insofar as it is itself a sort of process, similarly, it seems plausible as well to suppose that as existents which had not yet been real come-to-be real and as existents which have come to be real cease-to-be real, the ongoing reality of existents as (or when) they are real coincides with what we commonly think of as the present.

This close relationship between real existence and the present also may relieve some of our existential puzzlement, for example, when we wonder why the present is as it is and is not otherwise, and why it is we who are presently living and not Socrates or possibly our great-great-grandchildren. For, Socrates already has been (hence is not) real and our purported great-great-grandchildren are not yet (hence also are not) real. Whereas we are real, and so exist amid and alongside precisely those existents which are real (and so are constitutive of real existence) and not any other (sorts of) existents. And, since this totality of real existents amid which we (inasmuch as we are real) exist also constitutes the totality of present existents, of what presently exists, we should not be existentially puzzled why the present is as it is and is not otherwise, and why we and not others are the ones who presently exist.

But, why this temporal parochialism? On what basis do I associate us (myself, amid a cohort of people presumed here to include you), on the one hand, with those existents which in reality are and so, on the other hand, with what presently exist? Why not instead invoke Socrates and his posse? Indeed, if I am very lucky, you may not belong to my own cohort of living persons at all but, instead, have not even been born yet as I compose this—and yet you still are reading it!

My temporal parochialism is due to the simple fact that I am writing this, and as I write it it is indeed we (or at least me and my temporal cohort of existents) who in reality exist, and not Socrates or our great-great-grandchildren. As real existence proceeds, it therein is always comprised of certain real existents and not others, so that a certain intra-synchronic cohort of existents in reality exists instead of any another temporal cohort. But, again, as I write this this cohort of real existents indeed does include us (or at least me).

I am hereby giving an existential testimony, in other words, not attempting a divine revelation of sorts. Socrates' own existential testimony is, for instance, reported in Plato's *Apology* and discernible in the words ascribed to him in Plato's *Phaedo* to his soon-to-be-widowed, Xanthippe. And, future generations will have abundant opportunity to give their own existential testimonies—including, if I am very very lucky, in the form of discussions, critiques, or at least bibliographic entries, of this book. Still, as I compose these words, reality's existential train is passing through the depot of my real existence and not Socrates', nor our great-great-grandchildren's.

In sum, an appeal to temporality as such—or, especially, to temporal presentness in particular—is not at all necessary to explain why, for example, my present or Socrates' present or your present is as it is and is not otherwise. Once, again, we could replace my use of 'present' here with just 'real existence', or 'reality'—so that this says just that my reality and Socrates' reality and your reality each just is as it is and is not otherwise—without any loss of meaning.

These ruminations may, however, suggest that the sort of presentness which is most pertinent to temporality is closely associated also with human awareness and experience, inasmuch as experience is a primary way a presently existing person relates to (and, of course, is cognizant of) other temporally concurrent existents (for example, me and my computer screen, or Socrates and the Athenian jury).

Regarding presentness as perhaps a distinct(ive) temporal condition "lying between" pastness and futurity, moreover, a person's awareness of existents' coming-to-be real and ceasing-to-be real indeed seem sharpest in the case of those she is in fact experiencing, as various existents enter into and recede from her sensorial and cognitive awareness.

Still, it seems that temporal presentness should be distinguished also from experiential presence, or presence-to experience. Surely something can presently exist without being present-to anyone's experience; and it does not seem entirely absurd to wonder whether only what exists in the present can be present-to someone's experience. Many philosophers, though, have, for instance, distinguished memory, anticipation, and experience, and conceptually linked memory to the past, anticipation to the future, and experience to the present (and *vice versa*).

To develop this point, a comparison to space and spatial presence may be useful. Consider someone assaying her environment—looking at one thing, then another thing, and then yet something else. Suppose that, as she does so, she perceives not merely one thing, then

another thing, and so on, but she also discerns one thing's this-here spatial presence, then another thing's this-here spatial presence, and so on. She, in other words, attends specifically to each thing's spatial presence.

In this example, though, our percipient's experiential sense of each thing's this-here-ness may, someone might argue, be just a feature of (all) experience or else reducible just to her paying closer attention to, to focusing more concertedly on, each particular thing as such. But, must this be the case? Must we think of it in one of these ways?

What if, instead, spatial existence, or spatiality, does have a sort of ubiquitous this-here-ness which our intrepid observer is able experientially to discern as she assays diverse existents in her surrounding environment—which, when she attends to it, incites a distinctive sort of experience, which imparts a distinctive phenomenal flavor to her experience. If so, then it would seem to be something more than just an endemic feature of (all) experience. Arguably, too, this distinctive experiential discernment need not involve the sorts of accompaniments or outcomes which we would normally associate with paying closer attention to a particular object as such—for example, noticing more details of the object, or a heightened clarity and vividness to the object's appearance.

Actually, this sort of notion might in fact seem more plausible in the case of supposing a similarly ubiquitous this-now-ness to natural existence. At the very least, people sometimes do talk as though experience takes on a distinctive character when focused "in the now." And, as with natural existences' putative this-here-ness, it seems plausible to suppose that a natural existent may be present-to someone's experience—perhaps even to be undergoing detailed perceptual examination—without him being aware of its this-now-ness as such.

The claim that temporal presentness should not be just conflated with experiential present-to-ness might be even better illustrated and underscored by considering memory. A number of philosophers, I have noted, have conceptually linked memory and the past, or pastness. For these philosophers, the nature of memory is such that the present-to-ness of its intentional objects is always temporally conditioned by pastness. For these philosophers, that is, memory just is the cognitive faculty in virtue of which we can imagine or think about past existents. By its very nature, memory is always of something whose real existence lies in the past, which already has been. In sum, present-to-memory-ness entails pastness.

Consider, though, my memories of my doctoral dissertation defense. I may remember this episode in its pastness. I may be aware of its already-has-been or has-occurred existential character. I may, however, remember just the episode itself—that is, absent any time-sense, or sense of its time-locale, whatsoever. Perhaps more significantly, I may also remember this episode in its presentness. I may be aware of the presentness, the this-now-ness, of this episode, just as it was when it indeed did in reality occur.

I remember this episode and, for example, I find myself reliving the intense feelings I felt and various of my experiences of other things I experienced during my dissertation defense; and, in so doing, I find myself intensely aware of this episode's temporal immediacy or now-ness just as when it in reality indeed did occur. And, as I now not only remember this episode but am also cognizant of its presentness, I also relive my awareness during my dissertation defense of just how entirely in-the-past my previous academic life now is and how imminently in-the-future my embarking upon the University teaching-job market now is.

Harner terms the ability to place oneself in a temporal context other than that of his own current experience *temporal decentering*. And, John Locke, though known for equating memory's temporal intentionality with pastness, even argued that personal identity extends just "as far as any intelligent being can repeat the idea of any past action *with the same consciousness it had* of it at first, and with the same consciousness it has of any present action" [*Essay Concerning Human Understanding* II.XXVII,10].

Here, though, and in my example of reliving my doctoral dissertation defense, one might wonder whether memory is the pertinent mental capacity. Or, at least, one might wonder whether I am only "remembering" my doctoral dissertation defense, or whether instead I am now (re)imagining this scenario and vividly imagining myself as again experiencing it, so that it is due to imagination's functioning that I am convinced I am observing the episode's presentness, or remembering it in its presentness. Still, imagination is also different from perception or experience as such.

The seemingly close relationship, though, between temporal presentness and presentness-to experience may help integrate other aspects of temporality for us. For example, when we move from thinking of the sequence of natural existents as a simple (perhaps even static) order of synchronous and asynchronous existents to thinking of them as them-

selves temporally moving (taking time, persisting over time, and the like), doing so quickly or slowly (whether as such or comparatively), and doing so measurably, we may be implicitly invoking something like the conceit of an imagined, hypothetical observer (or temporally aware participant).

Or, recall McTaggart's (static) characterization of his temporal A-series as "that series of positions which runs from the far past through the near past to the present, and then from the present through the near future to the far future, or conversely" [Farmer, 188]. Implicit here is the notion that past existents and future existents, or the temporal "positions" they occupy, are as such measurable in certain ways—in particular, regarding their temporal distance from the present. Past existents may lie farther or nearer in the past; future existents may lie farther or nearer in the future; and in every case they do so in relation to the present, or present existents.

As with any space-like conception of time, though, it is either entirely opaque or else entirely arbitrary what location on McTaggart's coordinate system ("series of positions") is to be designated here to be the (actual) present. Yet, even here, the conceit of an imagined, hypothetically present temporally aware person is somewhat helpful, inasmuch as a static-time proponent can at least say that the present is just that "position" of time (or on the time-dimension) where such an observer happens to be located.

To be sure, what (or which) location this is remains opaque, or else arbitrary; but at least it provides some sense, for example, why the future lies to the one side and the past to the other side of that location, and in varying distances of a farther-or-nearer past-or-future sort.

Though distinguishable from just existential "is-ness," on the one hand, and from experiential present-to-ness as such, on the other hand, presentness is sometimes thought in a way to demarcate the interface between the two. On this approach, the present, accordingly, is not entirely just a subjective phenomenon; but nor is it a real feature of natural existence as such—or, at least, not apart from temporally aware beings' experiential encounters with the causes and conditions responsible for the contents of such beings' experiences. And, insofar as the notion of ascribing a this-now-ness to natural existence makes sense, perhaps we distinctly discern it by focusing our attention on this interface between real existence and subjective experience.

A common term for this interface or locus where reality and appearance meet—or perhaps part company—is the *specious present*.

As a person visually assays his environment, there are limits to how much of that environment he is able actually to see, or visually discern. These limits delineate his *field of vision*. That a person's field of vision is limited spatially seems evident. The supposition, though, is that a person's field of vision is limited temporally as well. This temporal dimension, or circumscribed temporality, to one's visual field is purported to be his "specious present."

Just as a person's visual sensory apparatus is capable of concurrently discerning only so much spatially, in other words, so too is it limited temporally. Oftentimes, this notion is thought to apply similarly to our other sensory modalities—perhaps even to other sorts of awareness and cognitive activity.

There are, however, serious difficulties with the notion of a (or the) specious present. For one thing, there in fact are two quite contrary conceptions of this notion. The specious present is indeed sometimes conceived (especially by philosophers) in the foregoing manner, as determined by a sort of temporal limit (a "how much") to occurrent human experiential cognizance. It, however, is sometimes conceived (especially by psychologists) in a contrary manner, as instead a sort of temporal threshold below which human experiential discernment breaks down.

Whichever way a person chooses to approach the notion, moreover, it seems reasonable to inquire how much time—that is, what temporal extent—constitutes this purportedly real temporal existent. Unlike philosophers, psychologists do try to investigate and articulate their conception empirically. Dobbs thus associates the specious present with, for example,

> the fact that we can hear very short bursts of sound, in such rapid succession that, although we are aware of successiveness, we cannot give the items in a *reliable* order. It is as if the whole situation was, in one sense, enjoyed together; while in another (equally obvious) sense it involves different phases, which are successive in time. It is known by experiment that, where the time separation between items of such an experience falls below a certain minimum level—about fifty milliseconds of physical time—it is impossible to place the items in a reliable simple-linear order. [Dobbs, 274]

But Fraisse reports a visual example, wherein

> if we project successively onto a screen, but within a limit of 125 msec. [milliseconds], four points which form a square, the subject perceives the square without realizing that the presentation was successive. [Fraisse, 120]

Fifty milliseconds and one-hundred and twenty-five milliseconds, of course, are both extremely brief temporal extents. Nevertheless, they still are also very different temporal extents, inasmuch as 125 milliseconds is some 250 % longer than 50 milliseconds.

A more serious difficulty with the notion of a (or the) specious present, however, is its seemingly inherent conceptual capriciousness. Fraisse, for instance, intimates the serious conceptual difficulties confronting a specious present proponent in noting that this experiential temporal "space" (he prefers the moniker 'psychological present,' and notes also William James' moniker 'sensitive present') is considered by some chrono-psychologists to consist rather of ("very") *short-term memory* [Fraisse, 120].

In a similar vein, J.J. Gibson declares: "I reject the assumption that present sensations are supplemented by memories of the past and by images of the future" [Gibson, 300]—where the emphasis here, in Gibson's declaration, should be placed on the phrase 'supplemented by.' The assumption Gibson rejects is that present sensations, memories of the past, and images of the future are distinct phenomena, so that certain seemingly complex sorts of human cognition may be explained by the first (present sensation) being supplemented by the latter two. Rather, Gibson had prefaced this declaration:

> The feelings of past, present, and future are merged or, more exactly, the activity of perception is acknowledged to be retrospective and prospective … As [William] James puts it, consciousness is a *stream* … Even a thunderclap, says James, involves a 'feeling of silence just gone.' There is always a 'consciousness of whence and whither.' [Gibson, 300]

Dobbs, who considers his work to follow in Gibson's investigative footsteps, utilizes binary- or reversible-illusions—Necker Cubes, for instance—to illustrate and support Gibson's perspective.

Necker Cubes are two-dimensional (flat) line drawings which resolve into three-dimensional representations (cubes) when one focuses on the center of the figure. The resultant three-dimensional visual representation, moreover, is reversible with respect to its seeming-front surface and its seeming-back surface; and such reversals are themselves distinctly noticeable. Dobbs emphasizes especially that an observed reversal is not instantaneous but is seen as a continuous transformation or shifting, even if a very quick one [Dobbs, 284].

Harner synthesizes both the foregoing empirical and conceptual points regarding specious-presentness in noting:

> The duration of the present can range from a split second to a longer time such as this minute, this mealtime, this morning, or this day. We subjectively perceive the extent of the present, and we can expand it to include the immediate past or the immediate future … there is no set time span for the present, and … the past and future domains of experience merge into the present. [Harner, 143]

Both empirically and conceptually, getting a hold on the specious present is akin to grasping pea-soup fog, or delineating its boundaries. For his part, Dobbs recommends that we just stop thinking of the so-called specious present (insofar as the notion might still have some utility) as a (or the) temporal present at all.

Philosophically, the specious present's problematic character was stated, perhaps most famously, by St. Augustine. He began his critique by asking, first regarding the present hundred years, whether a hundred years can be present; and he argues that this time span could be present only in virtue of one of its years being present. But, "whichever year of our hundred-year period we choose as present, those before it have passed away, those after it are still to come" [Sheed, 220].

Augustine then repeats the question in regards to whichever year one designates to be the present year as that year divides into months, whereupon he repeats it yet again in regards to the postulated present month as it divides into days, then yet again in regards to the designated present day as it divides into hours, until he finally argues in regards to the chosen hour:

> And that one hour is made of fleeting moments: so much of the hour as has fled away is past, what still remains is future. If we conceive of some point of time which cannot be divided into even the minutest parts of moments, that is the only point that can be called present: and that point flees at such lightning speed from being future to being past, that it *has no extent of duration at all*. For *if it were so extended, it would be divisible into past and future*. [Sheed, 220–221]

St. Augustine's critique here of temporal presentness supports the more traditional philosophical perspective adumbrated in Chapter 3.1, that only past and future—and not also something dubbed 'the present'—may properly be considered constitutive of time.

Augustine's critique also implies, however, that temporal presentness is neither a subjective phenomenon nor a real feature of natural existence—and, now, nor a sort of hybrid locus for interaction betwixt the two—for the simple reason that there is no such thing as temporal presentness. But, then, what can be said in regards to (human) temporal

awareness and cognition? Is there likewise in fact no such thing at all? Or, if there is, is it then more akin to a "grand delusion," no longer even deserving the somewhat less pejorative moniker of "grand illusion"?

We have, though, seen remarks (by Harner, Gibson, and Dodds) to the effect that temporal awareness is a more complex affair than is implied by a simple appeal to temporal presentness (whether real or "specious") and occurrent experience. Edmund Husserl and Henri Bergson are two well-known (early Twentieth Century) philosophical proponents of the notion that what we commonly think of as our present experience of temporality—or, the experience of present temporality—is a complex process involving several factors and mechanisms. Both also share a special interest in a central concern of my investigation as well: the distinctively dynamical-seeming character of time—that is, time as temporality.

Traditionally, our sensory modality of vision has been accorded exemplary, paradigmatic, prototypical status in philosophical discussions of the nature of sensory experience and its relation to real existence, and especially in introducing and exploring the distinction between reality and appearances. Husserl and Bergson, however, find audition (hearing) more illustrative of temporal cognition's distinctive character, and amenable to analysis and explication in that regard. Bergson proffers the following example:

> Whilst I am writing these lines, the hour strikes on a neighboring clock, but my inattentive ear does not perceive it until several strokes have made themselves heard … If, then, I question myself carefully on what has just taken place, I perceive that the first four sounds had struck my ear and even affected my consciousness, but that the sensations produced by each of them, instead of being set side by side, had melted into one another in such a way as to give the whole a peculiar quality, to make a kind of musical phrase out of it. [Bergson, 127]

This example's supposition of Bergson's initial inattention to the hour-strikings of the clock is not meant to imply that temporal cognition is somehow distinct and reflectively separate from occurrent experience. Rather, its purpose is to emphasize, first, the necessary role which remembrance does play in temporal cognition and, second, the related necessity of a successive multiplicity to its contents or intentional ingredients.

Equally important in this second regard, however, is the lack of mutual distinctness between successively constitutive content-states of this multiplicity. Bergson avers:

> Pure duration [in other words, dynamic temporality] is the form which the succession of our conscious states assumes when our ego … refrains from separating its present state from its former states … but forms the past and the present states in an organic whole, as happens when we recall the notes of a tune, melting, so to speak, into one another … We can thus conceive of succession without distinction, and think of it as a mutual penetration, an interconnexion and organization of elements, each of which represents the whole, and cannot be distinguished or isolated from it except by abstract thought. [Bergson, 100–101]

Far from being some sort of abstract mental process or phenomenon, distinct and reflectively separate from occurrent experience, temporal cognition is first and foremost evident in

> the fact that each increase in stimulation is taken up into the preceding stimulations, and that the whole [sequence of stimulations] produces on us the effect of a musical phrase which is constantly on the point of ending and constantly altered in its totality by the addition of some new note. [Bergson, 106]

Still, as an inherent feature of human mental life, temporal awareness is in general terms "nothing else but the melting of states of consciousness into one another" [Bergson, 107].

Husserl's treatment of temporal awareness and cognition differs from Bergson's mainly in terms of its detail, and in certain points of emphasis. Husserl also, however, prefaces his treatment with crucial remarks regarding his intent and methodology.

In particular, Husserl makes it explicit that his interest is entirely in "time consciousness" and not at all in temporal reality as such:

> From an Objective point of view every lived experience, like every real being and moment of being, may have its place in the one unique Objective time … It may be of interest to some to determine the Objective time of a lived experience … It may further be an interesting study to establish how time which is posited in a time-consciousness as Objective is related to real Objective time … But these are not tasks for phenomenology [his and Bergson's approach] … Just as a real thing or the real world is not a phenomenological datum, so also world-time, real time … is not such a datum. [Husserl, 23]

Indeed, Husserl goes so far as to assert even:

> One cannot discover the least trace of Objective time through phenomenological analysis. The 'primordial temporal field' is by no means a part of Objective time; the lived and experienced now, taken in itself, is not a point of Objective time, and so on. [Husserl, 24]

One of the additional details in Husserl's treatment concerns the role of remembrance in temporal cognition. Husserl, akin to Brentano, observes:

> When, for example, a melody sounds, the individual notes do not completely disappear when the stimulus or the action of the nerve excited by them comes to an end. When the new note sounds, the one just preceding it does not disappear without a trace… [Husserl, 30]

Husserl proceeds to emphasize, though, that the remembrance—Husserl prefers to term it *retention*—of a note upon the occurrence of a new one is insufficient to instigate a sense of temporal succession. He continues:

> We arrive at the idea of [temporal] succession only if the earlier sensation does not persist unaltered in consciousness but … is continuously modified from moment to moment … [such that] the content thus seems to be shoved back more and more. This modification, however, is no longer the business of sensation; it is not brought about through the stimulus. [Husserl, 32]

Husserl characterizes this sense-of-becoming-past-ness as the *running-off phenomenon*—as each newly displaced sensation "retentionally shades off," so that it "bears in itself the heritage of the past" [Husserl, 51] as it integrates into (in Husserl's marvelous metaphor) "a comet's tail of retentions" [Husserl, 52].

Another added detail in Husserl's treatment of temporal cognition is the notion that it typically includes as well an inherent sense of futurity, of more-to-come—Husserl terms it *protention*—in regards to the "continuum of presentifications" supplied by perception [Husserl, 76, 110, *passim*]. Of greater interest here, though, is Husserl's inclusion in his treatment of a notion of the temporal *now*.

We have seen Husserl explicate two of the ways in which temporal awareness is distinguishable from (even while it is not therein separably distinct from) the ongoing "flow" or "flux" just of sensory experience as such in terms of his "comet tail of retentions" and then, more briefly, in his notion of "protention." Husserl appeals again to his exemplary sensory mode (audition) to introduce a third key detail to his treatment of temporal cognition: the *now*.

Husserl seems to wonder: What distinguishes a sound which is in fact retentially shading-off from a similar-seeming (or -sounding) case which, however, is instead a matter of occurrent (auditory) perception and the changing character of its stimuli? Or, Husserl may prefer to express the concern here: Insofar for as we in fact typically do not

confuse the former with the latter (or *vice versa*), why do we not do so? Perhaps in answer to some such concern, Husserl ascribes a further implicit feature to temporal cognition's *modus operandi*.

Human consciousness, for Husserl, is as such a single "flow" or "flux." In a case of temporal cognition, though:

> A point, a phase of this flux is termed 'consciousness of sound beginning' and therein I am conscious of the first temporal point of the duration of the sound in the mode of the now. [Husserl, 44]

Subsequently, in a genuine case of (temporal) retention, "the sound vanishes [that is, 'runs-off'] into the remoteness of consciousness; the distance from the generative now becomes ever greater" [Husserl. 45]. Or, as Husserl also analyses this process,

> the duration of the sound apprehended in the now … constantly sinks back into the past and an ever new point of duration enters into the now or is now, … [from there] the expired duration recedes from the actual now-point … and moves back into an ever more 'distant' past… [Husserl, 46]

Husserl even characterizes (temporal) retention, in virtue of its continuous relation to occurrent perception, "the living horizon of the now" [Husserl, 66].

But, even though for Husserl (as for Bergson) human temporal cognition involves features and processes which as such are disconnected from real existence (or, from our experential sensory encounters with real existence), must Husserl's *now* be included among these? Or, perhaps more directly to my point, does the intractability of the specious present notion (in lieu of which Bergson and Husserl, arguably, proffer a far more plausible sort of approach to temporal cognition's relation to our ongoing sense-experiential "interfacing" with natural reality) invalidate the previous more general proposal in this chapter of a discernible this-now-ness sort of presentness to natural existence? Indeed, Husserl himself posits that "each temporal point of the ever fresh sounding and dying away has its material of sensation and its Objectifying apprehension" [Husserl, 91].

Given the severe difficulties we have seen to explicating temporal presentness in terms of some sort of distinctively temporal presentness-to experience, however, it may be more useful to return to the preceding point that temporal presentness is (conceptually) distinct also from just the (real) existence, or "is-ness," of natural existence and yet the two do seem closely related.

The question had been posed earlier in this chapter: What would be missing from reality (from "what is") if temporally aware beings did not exist? The suggested answer was *presentness*—at least insofar as presentness, in the sense of *now*, seems integral to a fully temporal conception of pastness and futurity, of synchronicity and asynchronicity, of time as passing and amenable to being kept track of (and maybe measured), and the like. Perhaps, though, the general notion of a this-now-ness to real existence suffices for such a presentness, as an adequate and proper denotation for such a *now*.

Arguably, in other words, real existence and real existence's existing now (or, what is and what-is's now-ness) are indeed not just one and the same thing. Still, suppose that reality is as such a dynamic (indeed the ultimate dynamic) process. Unlike its four-dimensionally block-like scientific faux-kin, in other words, real existence continually renews itself—is always and unendingly itself anew, or the like.

If so, then perhaps what a person attends to in discerning natural existents' this-now-ness (as continually brought to our attention or discerned by us, perhaps, by virtue of something like Husserl's *now*) is just this feature of real existence, though especially insofar as it thereby renders other aspects of nature's temporality discernible as well—for instance, its ongoing pastness and futurity. Akin to the proverbial falling tree and its putative sound, accordingly, perhaps real existence includes the requisite conditions for its own temporality (in virtue of its dynamicism); and yet, in the absence of temporally aware beings, real existence is only real existence and is not temporally real existence (that is, not temporally dynamic) as such.

At the same time, though, Bergson's treatment intimates another interesting avenue of investigation. It will help in developing this point to distinguish between *first-order* and *second-order* cognitive processes (or processings). The former are processes which manipulate, which do something with, the intentional objects or immediate contents of consciousness—with what one is aware of on a particular occasion or in a particular way, or what it is about or "in" the particular occasion or mode of awareness which renders one aware of that. Whereas, second order cognitive processes manipulate, do something with, first-order processes.

This distinction is not meant to suppose that these two sorts of processes can in practice be clearly, neatly, and unambiguously distinguished from one another. Additionally, the notion 'manipulate' or 'do something with' in my characterization of the distinction is meant to

indicate only that something happens owing to the mode of awareness or sort of cognition concerned, whether passively or actively. In virtue of memory, for instance, something experienced may become (passively) remembered (or, a memory). Whereas in virtue of reasoning, for instance, it might become (actively) evidence in an inference or be conceptually related to something else.

In Bergson's example of the hour-strikings of the clock, for instance, there were thus, on the one hand, his auditory experiences of the striking-sounds and his subsequent remembrances of them (first-order processes) and, on the other hand, what Bergson characterized as how they "melted into one another in such a way to give the whole a peculiar quality, to make a kind of musical phrase out of it" (second-order process).

The principal point to recognize regarding this example is that the temporal cognition as such is due to—indeed, in effect resides in—this second-order process(ing). Elsewhere, Bergson even supposes that our first-order processes, as they pertain to our "external" natural environment, may themselves be discrete (instead of continuous) in character. He remarks that

> each of the so-called successive states of the external world exist alone; their multiplicity is real only for a consciousness that can first retain them and then set them side by side by externalizing them in relation to one another. If it retains them, it is because *these distinct states of consciousness* which permeate one another, *imperceptibly organize themselves into a whole, and bind the past to the present by this very process of connexion*. [Bergson, 120–121]

Moreover, Bergson explains further, this "binding" and "connecting" is a consequence (or, perhaps, manifestation) of how the pertinent second-order process(ing) implicitly ("imperceptibly") views those distinct states (or, rather, their contents): "Consciousness, then, makes a qualitative discrimination without any further thought of counting the qualities or even distinguishing them as *several*" [Bergson, 121]. This, however, seems to allow the possibility that this second-order process(ing) is itself in fact also discrete in character.

From one perspective, if this possibility were in fact the case, it may be taken as confirmation that temporality is indeed less akin even to an illusion and more akin to a delusion, inasmuch as it incorrectly depicts the character even of our own temporal awareness. And yet, suppose that our common conception of time (that is, time as temporality) is mistaken both about the true character of natural existence and also

about the true character of human awareness and cognition as such—which, of course, is as it should be for a scientific Eleatic who is not also a Cartesian dualist of sorts. But now recall, too, the principal rationale for the classical Eleatic insistence that only a dynamical conception of time could pertain to (real) natural existence: namely, that only such a conception of time would accord with human experience, with what we in fact (commonly) mean when we talk and think about time.

Consequently, from this traditional perspective, if natural existence were in reality not itself dynamical in character, then time could not be a real feature of it. If, however, human awareness and experience is in reality not itself dynamical in character, then someone might respond that whatever concepts or conceptions we derive from it could not in fact themselves be dynamical in content or meaning in the first place.

Dainton, in his presentation and discussion of the pertinent issues and contemporary philosophical approaches to those issues, quotes Davies in effect expressing very much the sort of view argued at length in Chapter 2: "…the sensation of a flowing time and a moving present moment … is something so basic to my experience of the world that I am repelled by the claim that it is only an illusion or misperception" [Dainton, 93]. Indeed, Dainton himself reflects Bergson's and Husserl's shared postulate in this regard by opining: "This feature—call it 'immanent phenomenal flow'—is possessed by all forms of experience" [Dainton, 94].

I shall not attempt nor pretend to do justice here to the pertinent issues and contemporary approaches. Rather, I shall close this subchapter by devil's-advocating a few point *contra* also my own dominant perspective in this investigation.

For one thing, we have already seen research indicating that below a certain durational (time-measured) threshold, we are incapable of distinguishing what are in fact distinct events or phenomena. Moreover, an atomistically static account of human awareness (Bergson's "distinct states of consciousness," including sensorial) would surely postulate any succession of distinct occurrences of awareness or cognitive activity to fall well below that threshold—to succeed one after another (far more) rapidly then we could ever expect to discern by some sort of higher-order mental process(ing).

For another thing, modern scientific progress has repeatedly revealed the falsity (or at least the fundamental inaccuracy) of how we commonly talk and think about natural existence, including in recent decades about the processes which underlie, constitute, and existentially

anchor our own mental lives; and in a number of such cases our "common conceptions" themselves have adapted to the new perspectives or "facts" with very little loss in their expressive or communicative function and value.

Indeed, the toppling tree which opened this subchapter and our nowadays "common" conception of sounds "out there" as waves or reverberations or the like is an excellent example. Another, of course, is the "common" conception of colors themselves as somehow associating "out there" with some sort of (electromagnetic) "spectrum."

Additionally, a perhaps especially pertinent instance of science's ongoing impacts on how we "commonly" talk or at least (more pertinently) think (when we carefully, more reflectively do so) is its increasingly disabusing us of the presumption of some sort of "inner dwelling" conscious spectator distinct somehow from various of our cognitive processes or states themselves. This, moreover, is a potentially pivotal point where the analogy (on behalf of static conceptions) with cinematographic motion breaks down—including in regards to how any higher-order process(ing)s might relate to any comparatively lower-order process(ing)s.

Finally, though, these concluding reflections to Part I of my investigation should not be taken to presuppose that the dominant static (space-like, space-time) conception of natural existence introduced in Chapter 2 is destined to remain science's (or, more precisely, physic's) own overarching perspective on macro-existence—on the purported nature of "time" as it pertains to the reality of our perceptible natural environment. This conception (or its dominance) may indeed persist; but, then, it might not.

PART II

ARISTOTLE'S REAL ACCOUNT OF TIME

CHAPTER FOUR

PARMENIDEAN TIME AND THE IMPOSSIBLE NOW

Aristotle's principal investigation into the nature and reality of time occupies Book IV of his *Physics*. Explications of his account most commonly focus on one (or both) of either his assertion that "time is this: number (*arithmos*) relating to motion by virtue of (*kata*) before and after" [IV.219b2] or some of his remarks on the now (*to nun*). This is understandable.

Aristotle's prefatory remark that his number-of-motion formula expresses what time is (*estin*) is often taken to signal his intent that it encapsulates his conception of time. Some even construe Aristotle to be providing a definition of time—not merely to be characterizing time in a certain way and context, but to be identifying its *to-ti-ein-einai* (literally, *the-what-it-is-to-be* time; or, from its usual Latin equivalent, its *essence*). Indeed, there is a long tradition of philosophers (seemingly, we shall see, including Plotinus) using this formula or cognates of it ('time is the measure of motion' being the most popular) almost synonymously with "Aristotle's account of time."

Arguably, too, Aristotle's recurring discussions of the now comprise a major theme in Book IV. His arguments in those discussions are subtle and complex, and resonate notably with some contemporary debates. Aristotle seems as well to link the two (time and the now) conceptually. He avers, for example, that "the now delineates (*horizei*) time insofar as it relates to a before and an after" [IV.219b11]; and it (initially at least) seems reasonable to suppose that he intends the same before-and-after here as that referenced in his number-of-motion formula.

On the other hand, Aristotle simply does not identify his number-of-motion formula as the-what-it-is-to-be of time (its essence) but, indeed, just as something which time is, or may be said to be. But, this does not entail that this is all that time is, that there are not other things which time may also be properly said to be; nor even that this formula is privileged compared to any other appropriate characterization of time. In fact, we shall see (in Chapter 7) that this formula pertains to time principally as it relates to human temporal cognition instead of to real existence as such.

Discerning the now's role in Aristotle's account of time is, arguably, even more difficult. Aristotle insists several times in Book IV that, although time and the now seem related in certain ways, the now is in no way constitutive of time. For example, it is not any sort of "part" of time. He even states that the now's relationship to time is only "accidental" (*symbebeken*) [IV.220a22]. And yet, Aristotle does allege that "if time did not exist then the now would not exist; or, conversely, if the now did not exist then time would not exist" [IV.219b33]; and in Book VI he avers that the now is inherent (*enuparchein*) to time [VI.233b35].

Complicating matters further, Aristotle does not use 'the now' in the same sense throughout his discussions. In fact, he alleges late in Book IV to have therein discerned "how various are the ways in which we may talk about the now" [IV.222b28]. Unfortunately, he provides few markers, and no explicit summary, to demarcate how many different senses of 'the now' he takes himself to have discerned, much less what precisely they are.

Aristotle does claim in Book VI to focus there on a "proper and primary" (*kath'auto kai proton*) sense of the now [for example, VI.233b33]; but, precisely what this sense is is hardly evident. Nevertheless, this does suggest that Aristotle may have a primary, core, or maybe focal concept of the now. The various "ways in which we may talk about the now" could be variant specifications of this core concept, for instance, or maybe differing ways in which the core concept applies or functions in certain contexts.

A principal thesis of mine here in Part II is that Aristotle's account of time is more complex than has hitherto been recognized, or at least articulated. Consistent with my discussion in Part I (especially Chapter 2), moreover, insofar as we can identify something of a core conception of time for Aristotle, it most plausibly should emerge from elements in his account which respond to Eleaticism.

Here, I divide Aristotle's investigation of time into three main phases. The first phase (to be addressed later in this chapter) introduces the problem of time's reality from Aristotle's perspective. More precisely, Aristotle presents certain reasons or arguments for why philosophers (in his classical Greek context) might doubt (or even outright deny) time's reality. We shall see, however, that Aristotle's presentations of those reasons and arguments, and certain of their underlying notions and principles, also establish important context for his entire subsequent investigation.

The second phase of Aristotle's investigation (the principal topic of Chapter 5) states and critiques some accounts of time's nature and reality proffered by other philosophers of his day. Identifying who those philosophers may be is unimportant to my concerns here. What is important, rather, are some of the considerations, notions, and principles which Aristotle's critiques of those accounts introduce, presuppose, or otherwise bring to light as well.

Finally, the third phase of Aristotle's investigation (to be addressed in Chapters 6 and 7) develops what I shall characterize as his own "positive account" of time's nature and reality. We shall see that Aristotle's account involves elements relating back to the two previous phases of his investigation, and also new elements relating, on the one hand, to the structure and conditions of human temporal cognition as well as, on the other hand, to the reality of natural existence and motion as such.

It is significant, moreover, that Aristotle's principal investigation of time occurs in Book IV of his *Physics*. In Book III of *Physics*, Aristotle gives two main reasons why it is the most appropriate place for philosophical investigation of time.

For one thing, nature (*physis*) is the primary object of scientific study and knowledge. Like all classical Greek philosophers, Aristotle uses 'nature' in a general way to designate our cosmos (universe) as a whole. Here, though, he assigns a distinctive meaning to it, as designating a "principle of motion and change" inherent in natural existents; and, he asserts, time is correctly thought to be a necessary condition for motion and change [III.1.200b12 & 20].

Second, time is "common to and universally coextensive with (*koina kai katholou*)" natural existents and motions [III.1.200b22]. Aristotle avoids (even argues against) reducing temporality to motion. Nevertheless, time exists "in consort with" (*para*) every motion and change [IV.218b13], and such that those things said to exist "in time" are conjoined, or all-encompassed (*periechesthai*), by virtue of time [IV.221a28].

Significantly, too, Aristotle's presentations of and responses to the Eleatic Zeno's arguments against motion (mentioned in Chapter 2, and the primary topic of Chapter 8) occur in Book VI, and not in Book IV, of *Physics*. This is because those responses, I shall argue, presuppose Book IV. Contrary to a common interpretation of Aristotle, they do not as such address the real existence of time at all. Indeed, without relying on Book IV to provide necessary conceptual background to Book VI, Aristotle's responses to Zeno in the latter are consistent with a static approach to time—indeed, with Zeno's particular Eleaticism.

Construed as attempts to demonstrate (or at least defend) time's reality, in other words, Aristotle's responses to Zeno's arguments as such beg-the-question. Most especially, the now's meaning and role in the context of Aristotle's treatment of Zeno may be understood to convey a (temporally) dynamic conception of motion *contra* Zeno only insofar as it is understood to harken back to certain of Aristotle's discussions of the now previously in Book IV. Still, Aristotle's responses to Zeno do contribute to our understanding of Aristotle's approach to the relationship between motion and time, and so are pertinent and useful to this investigation.

Actually, an argument can be made that Aristotle is under no illusion about this. For one thing, of course, he very well may have intended that his responses to Zeno are to be understood against the background of his previous investigation (in Book IV) of time's nature and reality. Moreover, though, Aristotle is clear that the primary challenge to time's reality does not come from Zeno but from his mentor, Parmenides. In particular, the primary Eleatic challenge to the real existence of time arises from Parmenides' argument roughly that: If past and future are unreal, then time is unreal; past and future are unreal; therefore, time is unreal.

Parmenides' argument, I maintain, is fundamental to the purpose and context of Book IV. Aristotle's presentation of it as prefatory to his investigation is usually treated, though, as nothing more than that—as an incidental component to how he happened to choose to introduce the topic of time.

In support of this usual interpretation, it is difficult to discern precisely where in Book IV Aristotle might intend to tackle the argument head-on and articulate an explicit response to it. Perhaps, though, this is explained by the fact that Aristotle in a way does not intend to respond to it, for the simple reason that he in fact agrees with it (in a way, or with a crucial *caveat*).

A strong argument can also be made that his failure to address the Parmenidean argument directly and explicitly reflects and is explained, rather, by a strategy discernible a number of places in Aristotle's writings. In particular, Aristotle seems to hold that the reality of something has been demonstrated if, presuming it to be real, he is able to analyze its nature and function as a presumed constituent, denizen, or feature of reality. Insofar as succeeding at this endeavor constitutes a positive (*albeit* indirect) demonstration of something's real existence, explicitly responding to assertions of its unreality are then unecessary.

Some of Aristotle's discussions of human temporal awareness are especially amenable to being read in this strategic way. Aristotle does not accept the Eleatic divorce between appearances and reality, between human experience as such and its presumed (real, natural) intentional objects. A strong case can be made, in particular, for reading Aristotle as implicitly arguing something like:

(i) If time were unreal, then we could not perceive the temporality of natural existents.
(ii) But (my analysis shows) we can (indeed do) perceive the temporality of natural existents.
(iii) Therefore, time is not unreal. It is indeed real.

Still, Aristotle does not seem to respond directly nor explicitly to Parmenides' argument. Indeed, he in fact echoes the gist of the argument—its core perspective—in his own voice several times during his subsequent investigation.

How can this be? Aristotle, I maintain, is a temporal realist. His conviction that certain features of human awareness are pertinent to the (real) nature of time does not signal an Eleatic-friendly internalization approach. To the contrary, I believe, he seeks to propound a genuinely dynamic conception of time's reality instead. But, then, what about Parmenides' argument?

For one thing, the foregoing does not say, nor imply, that Aristotle entirely acquiesces to Eleaticism. I have postulated, rather, that he agrees with one particular Eleatic argument—*albeit* Parmenides' principal argument against the reality of time. Arguably, Aristotle may be understood, rather, as consequently maintaining that time both is and is not real.

Aristotle's mentor, Plato, more famously played a similar gambit in his *Meno* concerning the possibility of acquiring knowledge, maintaining that we both do (in one sense) and do not (in another sense) acquire knowledge (or, "learn"). And, Aristotle's famous formulation of the law of non-contradiction stipulates that the same thing cannot both be and not be at the same time and in the same respect.

Concordantly, Parmenides' argument (if sound) demands only that time be unreal in the same sense (or respect) in which past and future are unreal. Might there be some other sense (or respect) in which time may still also be authentically real? Does, for instance, the nature and character of temporal cognition imply or allow for a sense (or respect)

in which temporality may properly be seen also to be a real feature of natural existence (despite its unreality with respect to its pastness and futurity)?

Aristotle indeed introduces the principal topic of his investigation by asking the Eleatic question: "whether time has real existence (*ton onton estin*) or does not have real existence (*me onton*)" [IV.217b31]. Aristotle immediately intimates, however, that there may be more to this issue—and to his investigation—than the simplistically 'is or is not' format of the question might seem to suppose. In particular, Aristotle continues, there are considerations which lead one to suspect that "either it entirely does not exist or else only barely (*molis*) and dimly (indistinctly, confusedly: *amudros*)" [IV.217b33].

Aristotle smuggles in this third option without fanfare, or even further discussion at this point. It will, however, prove fundamental to his own account of time, I maintain, as indeed unreal in the manner or respect alleged by Parmenides' argument but as still also real insofar as it is nevertheless a (real) feature of (real) natural existence—*albeit* one which is consequently dimly, indistinctly, smudgedly, or the like, real.

This said, let us now turn to the actual text of Aristotle's investigation, beginning with what I have characterized as its first (as it were, negative) phase.

The first (and principal) consideration which makes one suspect that time is unreal, according to Aristotle, is the Parmenidean argument. I have already stated a simplified version of the argument. The actual argument, as recounted by Aristotle, centers on the premise that time is constituted of past and future. Aristotle summarily states the argument as follows [IV.217b33–218a2]:

> Assuredly, one part of time *has been* but *is not* while the other part of time *will be* but *is not* yet. But, time—both indefinite (*apeiros*) time and the [definite] sort of time we always come across [that is, experience, or discern]—is constituted of these. It seems reasonable, moreover, to suppose that what is constituted of what is not real cannot have a share in reality either.

Notice, too, that Aristotle here smuggles another nuance into his presentation: a distinction between indefinite time and definite time.

Translators assign a number of equivalents to the Greek term *apeiros*—for example, unlimited, limitless, unbounded, boundless, indeterminate, interminable, infinite. Sometimes context suggests that one of these English equivalents may be more perspicuous than others; but oftentimes translating *apeiros* is largely a matter of preference. Two

other points, though, are noteworthy: First, Aristotle designates definite time to be the one "we always come across" and, second, Aristotle seems to imply that an account of time which accounts only for definite time (and not also for indefinite time) would be incomplete.

A potential logical difficulty with the Parmenidean argument is a logical fallacy termed the *composition* fallacy. This error in reasoning occurs when someone infers that what is true of something's parts applies to the whole comprised of those parts, without also providing special justification for doing so. For example, a house constructed of rectangular bricks need not be rectangular.

Aristotle, however, immediately provides justification for this argument's inference of time's unreality from the alleged unreality of its parts [IV218a3–6]:

> Moreover, in order for anything which is divisible (*meristos*) to exist, it would have to be the case that when it exists all of its parts (*mera*) shall exist, at least for a time. In the case of time, though, some of its parts have been while its other parts will be; and consequently none of them exist, even though time is in reality a divisible sort of thing.

Aristotle here seems to characterize past and future as themselves pluralities, or multiplicities ("some of its parts … other parts …"). Plausibly, what Aristotle in particular has in mind here are whatever already *has been* and whatever *will be*. The argument also seems meant to apply equally to indefinite time and (or) to definite time. If so, this does suggest that indefinite time and definite time do consist of the same sorts of parts, and so are very closely related.

Aristotle buttresses the Parmenidian argument further by supposing that past-and-future's principal competitor for time's constitution is the now (*to nun*), or nows (*ta nun*). Against this possibility he argues [IV.218a6–8]:

> The now is not a part of time. For, a part measures out [the whole], in the manner required by the way in which the whole is constituted of its parts. But, it seems not to be the case that time is constituted of nows.

Initially, this seems a strange argument, even for Aristotle. The complete argument implied here seems to be something like:

(1) A part measures out the whole.
(2) A part may measure out the whole only if the whole is constituted of that part.
(3) Time is not constituted of nows, or the now.

(4) Therefore, the now does not measure out time.
(5) Therefore, the now is not a part of time.

But, why would Aristotle suppose that premise (3) is any less controversial than (5), the argument's intended conclusion?

One answer may derive from the conceptual closeness of 'constituted of' to 'constructed from.' Something may be considered a part of some whole without contributing as such to its construction. For example, the parts of a house may include bedrooms, bathrooms, a kitchen, and so forth. Whereas the house would more properly be said to be constructed from building materials—for example, bricks and lumber.

Now, premise (1) here asserts a constraint on what could qualify for consideration as "parts of a certain whole." The example of house-parts seem to pass premise (1)'s test. A house's various rooms do indeed 'measure it out' in some manner—for instance, they yield its square-footage. Perhaps they also 'measure out' its functionality by virtue of the sorts of rooms they are—for example, one can sleep in the house, take a shower and cook a meal in it, and so forth.

Premise (2), however, asserts an additional constraint for something to be properly considered 'parts of a certain whole.' Our topic, recall, is time's real existence. In this context, premise (2) in effect asserts that a real-whole (or, the real existence of a certain whole) is 'measured out' only by those sorts of parts which also define its constitution—by those sorts of parts from which it is (or was) constructed to be the particular whole it is. In the house example, this would indeed be the materials that went into its construction. It would no longer include other sorts of "parts" into which we might deconstruct ("divide") the house for other purposes—for example, to compute its square-footage, or to extol its qualities as an enclosed living environment.

This may clarify why, or in what sense, Aristotle follows Parmenides rather than Plato regarding the proper "parts" of time. Aristotle does not deny that time may in some sense, for certain purposes, be divisible, for instance, into days and years (Plato's "parts" of time). What he denies is that time is, as it were, constructed of (or from, or out of) such items.

Arguably, this is also the sense in which Aristotle thinks that premise (3) is reasonably uncontroversial: Time is not a construction of nows. Whereas, Aristotle maintains, it is reasonable to think of past and future as time's proper construction materials, as it were—as what constitutes time insofar as it may be construed to be a certain sort of whole.

But, why is it patently unreasonable, in Aristotle's estimation, to think of time as a construction of nows? Part of the answer lies in something which 'the now' does not denote for Aristotle. In particular, it does not denote *the present*.

In certain contexts, Aristotle's "now" does do some of the conceptual work commonly associated with "the present." There is a distinct Greek term, however, for the present—*to paron*—and Aristotle is aware of the difference. Indeed, he avails himself of his linguistic resources to specify when he does intend "the now" to function similarly to "the present." Later in Book IV, for example, he will have occasion explicitly to talk about "the indivisible present now" (*tou parontos nun atomou*) [IV.222b7].

Further indicating his awareness of the distinction, when Aristotle argues later that the now is as such indivisible [e.g. VI.231b ff.], he uses a different term for this notion as well. The now as such is not said to be *atomos*, as his present-now is, but *adiaireton*. Its indivisibility is more akin to that of a geometric point, Aristotle maintains, than to an ultra tiny yet not-further-dividable quantum of real existence (an atom).

This difference between the indivisibility of the present and that of the now as such does, however, beg us to ask: If the now is *adiaireton*, then how can the present-now—the now when it is (more or less) functionally equivalent to the present—be *atomos* instead? Still, whatever Aristotle's answer to this question would be (if he has one, and I think he does), this difference may contribute to Aristotle's presumption that, insofar as time may be thought of as constructed from anything at all, it surely is not constructed from nows. For, indivisibles of the akin-to-a geometric point variety (that is, *adiaireta*) cannot function as "building materials" for anything (though, to the converse for Aristotle, certain sorts of things—for example, a geometric line—may be thought of as divisible with respect to them).

In any case, Aristotle immediately assigns 'the now' a more specific meaning as that "which appears to delimitate (*diorizein*) the past and the future" [IV.218a9]. Construed this way, premise (3) above seems reasonable, since this now by definition implies the existence (with respect to time) of past and future just as such, as thereby irreducible to any multiplicity of nows. Notice, moreover, that this Aristotelian now is not some third part of time. It is not something which lies in between the past and the future. Rather, the past concludes at and in this now even while the future commences at and from this same now.

For Aristotle, futurity commences exactly when pastness ends, in

other words, and pastness ends exactly when futurity begins. This "when," moreover, is not itself anything apart from nor existentially additional to the past and the future. Time does not, as it were, step from the past into the future by way of this intervening now. It instead transitions from pastness into futurity; and this now in effect just designates this transition.

This does, however, imply in regards to time that everything either has been or is yet to be. Nothing ever (temporally) just is—except insofar as we may indeed accord a certain dim, indistinct, maybe smudgy sort of "is" to this past-into-future (or future-from-past) transition—perhaps by virtue of how the transition does relate to real existence.

In any case, another reason why time could not be constituted of (or from) nows, Aristotle next argues, is that the very notion of the now is an absurdity. It's (real) existence, therefore, is as such impossible. Aristotle's reasoning for this viewpoint involves an implicit umbrella argument, and two subsidiary arguments. The format of the umbrella argument is what in logic is termed a *dilemma*:

(i) The now must be either X or Y (where X and Y seem intended to be, in Aristotelian terms, "opposites"—that is, such that X entails not-Y and Y entails not-X).
(ii) But the now cannot be X.
(iii) Nor can the now be Y.
(iv) Therefore, the now cannot "be" at all.

The subsidiary arguments establish the two denials, premises (ii) and (iii).

The argument continues Aristotle's current interest in the now as what delineates past and future. Aristotle introduces the implicit umbrella argument by asking whether this now "remains always one and the same (*hen kai tauton*) or instead is always another-and-then-another (*allo kai allo*)" [IV.10.218a10].

In my above sketch of the umbrella argument, accordingly, X would stand for 'always one and the same' and Y would stand for 'always another and then another'. Aristotle proceeds to argue against this second alternative first, in effect demonstrating (iii), and then returns to the former alternative, which pertains to (ii).

The first subsidiary argument [IV.218a11–21] seems best understood as a *reductio* argument. That is, the notion that the now is always another-and-then-another (or, Aristotle sometimes says, different-and-

again-different) is postulated or presumed; but, Aristotle then argues, this presumption cannot be the case, it cannot be maintained, because it leads to an absurdity, an impossibility.

Filling in some logical details on Aristotle's behalf, the first subsidiary argument may be articulated as follows:

(1) Suppose that the now which delineates past and future is forever different-and-again-different [here, *heteron kai heteron* instead of *allo kai allo*].
(2) Parts which are different-and-again-different with respect to time cannot exist concurrently with one another; rather, one part must always exist before another (that is, a next) part could exist.
(3) Indeed, the former (or, previous) part could no longer *be* but must cease to exist sometime before the other (the next) part could exist.
(4) Therefore, these parts cannot exist concurrently with one another but the before-now will have ceased to exist before the other (the after-now) can exist.
(5) The before-now could have ceased to exist only at (or during) itself, at (or during) the after-now, or else somehow amid the innumerable nows between these.
(6) The before-now could not have ceased to exist at itself, since it then existed.
(7) The before-now could not have ceased to exist at the after-now, since the after-now in no way coincides with it but exists only after it.
(8) Therefore, the before-now would have had to cease existing amid the (innumerable) nows between it and the after-now.
(9) Something may cease to exist at or amid another only if they exist concurrently, at least to a degree.
(10) Therefore, the before-now would have to exist concurrently with the infinity of nows between it and the after-now [or, at the very least, concurrently with some one of them] even though these nows are other (or different) from it.
(11) This, however, is impossible.
(12) Therefore, the supposition that the now is forever different-and-again-different (or another-and-then-another) cannot be the case.

It is difficult to discern and articulate a coherent image of how this argument is asking us to think about these postulated parts which are said to be different-and-again-different. One image is that the now's

different-and-again-different character intends a consequent multiplicity of nows which we are asked to think of as in effect constitutive of a time-line, of a sequential ordering of times-when, or some such.

This image does seem especially *apropos* premise (2), with its intimation that these parts are different-and-again-different at least partly in regards to their ordering, or existing in an ordered fashion. In the context of the argument, however, would such times-when have dimension? With respect to time, dimension as a feature of individual times-when would mean duration. Is a time-when also a certain duration of time, or does it lack all duration?

Aristotle's notion of the now as delimitating past and future does seem, as indicated previously, to intend a nondimensional, durationless conception of the now. We might imagine such a now as akin to a wall dividing the past to one side of it from the future to its other side; but this "wall" as such has no thickness whatsoever. In terms of spatiality, such a wall would be two-dimensional instead of three-dimensional.

Suppose, for instance, that the space on one side of the wall is illuminated while the space to the other side is in darkness. Such a "wall" would be indistinguishable from just the joining of the two spaces into a larger whole even while they also remain two—as if we could remove it and yet the luminous space remains luminous and the dark space dark. For later purposes (in Chapter 7), we might entertain the additional possibility that this "joining" of the illuminated side of the space and the dark side of the space—as it were, the existential transition from the one side to the other—is not utterly, entirely abrupt but somewhat graded, fuzzy, or smudgy in character.

In any case, to continue and extend our current line of conceptual imagery, a geometric line (unlike a geometric plane) is, in turn, utterly one-dimensional. In this case, an easy image would be a sheet of paper that is one-half red and one-half blue, with nothing discernible to divide (actively segment off) the halves from one another.

Finally, a geometric point (Aristotle's closest analogy to a durationless now) is, well, no-dimensional. The sort of conception this leads us to comports especially well with this argument's claim that an innumerably infinite series of nows exist between any given (distinct) pair of nows—no matter how "close" to one another they may be.

On the other hand, this conception of the argument's different-and-again-different supposition threatens to render incoherent the argument's equally central language of ceasing-to-exist. What could be

meant by characterizing an entirely durationless something-or-other as ceasing to exist—indeed, as in any way "ceasing"? And, what could be meant by talking about such a temporally no-thing ceasing to exist "at" or "amid" anything at all, much less at are amid other purportedly temporally no-things?

To be sure, this argument seems an odd context for the language of *ceasing* in any case. Perhaps its presence in the argument rests upon Aristotle's general notion that every change is to be conceived as a process of some sort or other, including generations (comings-to-be) and corruptions (ceasings-to-be).

Still, one wonders why Aristotle would blithely apply this doctrine to such an exotic item as the now. He is sufficiently cognizant of the now's exotic character to adamantly insist that it is not any sort of substance (*ousia*); and there is a close connection in Aristotle's thought between substantial existence (*ousia*) and real existence (*ontos*), so that the proper subject of comings-to-be or ceasings-to-be in the primary (existential) sense is always some substance.

But, suppose that in the context of this argument these multitudinous nows or times-when are not to be entirely no-durational but to have some (temporal) extension, even if it is vanishingly short (suppose, in other words, that they are here supposed to be *atoma* instead of *adiaireta*). An immediately evident difficulty with this supposition, however, is its incompatibility with the argument's claim that an innumerably infinite series of nows exist between any given pair of nows. No matter how vanishingly short these nows' durations may be, the temporal space between any two nows could never countenance, much less consist of, an innumerably infinite number of them.

Suppose, for a contemporary example, that time's incredibly tiny durational quantum is the Planck time of 10 reduced to the -34th power of a second. This entails that each second will consist of 10 raised to the +34th power of time-quanta. As tremendously huge of an immense number of nows as this is, it still is not infinite beyond all numeration. Depending on how temporally close or far apart some pair of different nows are, some fraction or else some multiple of this (Planck) number of nows would lie between them.

Perhaps we need a different guiding conceptual image. The notion that the "parts" referenced in this arguments consist of a sequential ordering of nows may presume that the sense in which the now must be always different-and-again-different is akin to the sense in which a sequence of chronologic times and dates will be different-and-again-

different (for example, after 1:00 a.m. comes 2:00 a.m., then 3:00 a.m., and so forth on a certain date, then likewise on the next date, *et cetera.*) Still, how is this different from thinking of them as an ordered multiplicity of distinct whens or times-when, or resolve the peculiarity of talking about their ceasing-to-be?

For, the intent of Aristotle's posit would remain untouched by such labeling. We would still be considering distinct nows which thereby differ from one another in regards to their nowness, to their being particular nows. Applying such labels as '1:00 a.m.', '2:00 a.m.', *etcetera* to them does not alter this basic fact of their character, as presumed for this argument.

Actually, though, the argument's only explicit reference to a multiplicity of nows as such is the assertion that an innumerable infinity of nows would lie between any before-now and after-now pairing. This reference is significant and needs explaining. Nevertheless, the argument does not explicitly state that such a multiplicity of nows is implicit just in the different-and-again-different character as such which the argument presumes for the now.

Perhaps the "parts which are different-and-again-different" here are, instead, just the past and the future themselves. Perhaps the before-now is or designates just the past (what no longer is with respect to the now as it delineates past and future) while the after-now is or designates just the future (what always lies ahead—is yet to be—with respect to the now as it delineates past and future). In this case, both of these nows—that is, both the past and the future—would in fact each be different-and-again-different.

The consequent multiplicity of nows would then in effect be or designate the ontic detritus, as it were, of the past-future joining's or transition's unrelenting existential striving and proceeding. Arguably, though, such leavings would consist only of "nows" which no longer are. The argument's after- or future-now(s) would then seem unaccounted for, even though steps (2) and (3) do seem to impute existence (or at least a potential for existence) to them.

Still, on this rendering, the reference in step (5) of the argument to innumerable nows between the before-now and the after-now would then concern whether there can be any sort of gap between them. The argument's consequent demonstration of the absurdity or impossibility of such a gap might then constitute, in effect, a denial of some third "part" to time—for example, a present—which connects past and future by lying between rather than immediately joining them, by

bridging them rather than designating an indivisible transition from one into the other.

Actually as well, though, when the now later reenters Aristotle's investigation (in Chapter 6), the conceptual and dialectical context of its doing so (we shall see Chapter 7) is more akin to the concerns addressed below in the second subsidiary argument than whatever the precise concerns raised in the first subsidiary argument are meant to be.

Perhaps, then, discerning and articulating a coherent image or understanding of the now as it pertains to—what it is meant to designate in—the argument's various premises is so difficult because a correct understanding of the now as what delimitates past and future renders at least some of the argument's posits and concerns moot, irrelevant, just besides the point.

Accordingly, perhaps this first subsidiary argument's most pertinent points for Aristotle's investigation of time's nature and reality are certain fairly general ones. Two such points may be: First, a conception of the now which does seek to constitute time of, or which does imply or generate, a multiplicity of existentially distinct nows is destined for philosophical trouble. Second, although the argument's language of *ceasing* may be specific to this argument's (perhaps incorrect) conception of the meaning or implications of supposing the now to be different-and-again-different, still its presence may intimate that Aristotle is indeed intent on articulating a dynamic conception of time's reality.

Aristotle's second subsidiary argument, against the presumption that the now must be always one and the same, is much briefer than the first. It also in fact consists of two nested arguments rather than having a single logical structure. The argument [IV.218a22–29] may be reconstructed as follows:

(1.1) Nothing divisible and determinately extended (*peperasmenou*) has a single terminus (*peras*).
(1.2) The now is a terminus (of time), and time as we come across it (experience, or encounter it) is always determinately extended.
(1.3) More specifically, the now (*albeit* perhaps among other things) terminates the determinately extended time(s) we encounter.
(1.4) The two termini [implicit in (1.1)] of some determinate extent (or, of anything determinately extended) cannot be one and the same (existent).
(1.5) Therefore, the now as terminus of determinately extended time cannot be single (that is, one and the same).

(2.1) Concurrence in virtue of time (*to hama kata chronon*) implies existing in relation to one and the same now, and *vice versa*.
(2.2) Therefore, if the now is (always) one and the same, then things which putatively exist in relation to any two or more nows will in fact exist concurrently (so that "things which occurred ten thousand years ago would be concurrent with what has occurred today and nothing would occur before or after anything else").
(2.3) But, this consequence is absurd.
(2.4) Therefore, the now cannot be forever one and the same.

Steps (1.1), (1.2), (2.1), and (2.2) here are taken explicitly from Aristotle's own statement of the argument. Although it is difficult to discern any sort of implicit logical structure meant to utilize these four steps in a single argument, the two arguments do seem conceptually somewhat related. In particular, the example in (2.2) of ten thousand years ago *versus* today does seem implicitly to invoke a determinately extended time—which the first sub-argument claims always demands at least two not-one-and-the-same nows.

Initially, though, this dual argument may seem not to address at all the stated topic of the now as what delimitates past and future. It begins by introducing a seemingly new sense of the now, as what terminates definite time(s). The second sub-argument does focus on concurrence *versus* nonconcurrence, and so echoes the previous argument's concern over sequential ordering. Nonetheless, its concern in this regard seems unrelated to things which occurred ten thousand years ago therein no longer existing; and the "today" terminus of this purported ten-thousand year extent of time seems even farther removed from the past-future core function of the now currently (supposedly) under investigation.

This does not mean, however, that the now which delineates past and future cannot be in any way related to what is argued here regarding the supposition of the now's being one-and-the-same. Indeed, these two subarguments seem more amenable than the previous argument to being read in a dynamical context—for example, where this now is thought of as in a sense the leading edge of temporal existence's ongoing procession.

One may argue, for example, that it is precisely because of this now's dynamic procession that what happened ten thousand years ago instead of today indeed happened ten thousand years ago and not today. Or, more generally, that it is precisely because of this motion regarding the

delineation of past and future that the determinately extended time(s) of the first sub-argument are indeed temporal extents, or extensions of time. On the other hand, this observation may also just emphasize the potential disconnect between this pair of subarguments and the now (supposedly) under consideration.

Arguably, the motivation behind presuming that this now must remain always one and the same is that it never becomes other than the now which delineates past and future. It invites us to think of this now as always another-and-then-another only superficially to, or derivatively from, the seemingly recurring, anewing character of dynamic existence as such.

But, in that case, what is the now's role in, or relating to, extents of time and the termini referenced in (1.4)? And, how could it account for (temporal) concurrence *per* (2.1) without the implication alleged in (2.2)?

CHAPTER FIVE

COSMIC MOTION AND THE SPEED OF TIME

Three associations were axiomatic to classical Greek thinking about our universe, or *cosmos*:

(A) The natural universe is the temporal universe.
(B) The natural universe is the universe of motion and change.
(C) The natural universe is the real universe.

The obviousness of (A) and (B) to the Greek mind is one reason why Eleaticism was so shocking and troubling. Parmenides did, however, remain faithful to (C). Having denied the reality of time, motion, change, diversity, and plurality, he ultimately inferred that the (true) reality discerned by pristine reason is a singular, unmoving, unchanging, atemporal, internally undifferentiated perfect sphere.

When Aristotle next considers "previous doctrines" of time, accordingly, the doctrines he considers accord with (A) and (B) in, *contra* Eleaticism, associating time with the natural cosmos and (or) motion and change within it. He considers three doctrines. The first two harken to Plato's account:

(I) time is "the motion of the whole [cosmos]"; and
(II) time is "the [heavenly] sphere itself." [IV.218a33 f.]

Distinguishing these two may reflect Aristotle's recognition of this ambiguity in Plato's own account in his *Timaeus*. Or, Aristotle may have in mind differing ways others in the Academy understood Plato. In any case, Aristotle then considers a doctrine he claims to be the one most commonly held among previous philosophers:

(III) time is "motion; that is, any manner of change" [IV.218b9 f.].

5.I. *Time as the Motion of the Cosmos*

Doctrine (I), however, is ambiguous. For Plato (like Parmenides), the natural universe is a tremendously humongous sphere. Also for Plato (unlike Parmenides), the innards of this sphere divides into the Earth and the Heavens. The latter in turn consists of a nested system of spheres designed to accommodate astronomical data. Accordingly, 'the whole' could refer either to the outermost sphere delimiting natural existence, or to the system of spheres comprising the Heavens. Aristotle's critique canvasses both readings [IV.10.218b1–4]:

> But, on this account, a part of the revolution is surely also a certain time, even though it is not a [complete] revolution—for, what is attained is part of a revolution, not a [complete] revolution. Besides, if the heavens were many, then time would be equally the motion of however many of them there are; and so many times would exist concurrently.

The first sentence here is directed against the former reading, and the second against the latter reading. They both seem meant to reject doctrine (I), however, in effect on the grounds that it implies an unacceptable multiplicity of times. The challenge is to decipher how they do this.

The argument implicit in the first sentence equates the motion of outermost sphere with a complete revolution of it. It argues that whatever warrants equating time with that motion should also warrant identifying time with a portion of that motion, with a partial revolution; and this in turn implies that "a part of the revolution is also a certain time."

The meaning of this implication, however, is in its turn ambiguous as well. The phrase 'a certain time' is my general choice to translate the Greek '*chronos tis*'. But '*tis*' ('a certain') can have three different meanings:

(i) It may denote a particular individual or instance.

On this reading, Aristotle is arguing that insofar as a particular complete revolution is a particular instance of time, so too would a particular partial revolution also be a particular instance of time. Consequently, that complete revolution and that partial revolution are two instances of time (presumably even when the former is the revolution of which the latter is a portion).

(ii) It may denote a type, kind, or species of something.

In this sense, for example, a cedar is a certain tree and an elm is also a certain tree. To be sure, 'a certain tree' may still intend some one particular tree—as meaning (i) would suggest. But 'a cedar is a certain tree' may also intend that cedar is one type of tree, and likewise for 'an elm is a certain tree'. Hence, cedar and elm are two types of trees. On this reading, Aristotle would be arguing that if a complete revolution is a type (species) of time, then a partial revolution should also be considered a type (species) of time. Consequently, the revolution and the partial revolution constitute two types of time.

(iii) Conjoined to something extended, *tis* may denote "a certain amount" of that extension.

This third meaning, though, ambiguously cuts across the previous two sorts, now in reference to something's extent. Akin to (i), someone who runs a particular one hundred meter stretch of turf runs a certain particular or instance of distance; and someone who runs a particular two hundred meter stretch of turf also runs a certain distance. Akin to (ii), one who runs one hundred meters is someone who runs a (certain) type of distance, an amount of extension distance may come in; and likewise for one who runs two hundred meters. We must, then, distinguish further:

(iii-a) *tis* as denoting a particular instance of extendedness of just the particular amount (extent) it is; and
(iii-b) *tis* as denoting a type of amount which extension may come in.

In the case of Plato's sphere, the pertinent amounts would be (complete) revolutions and (whole) fractions of revolutions. A complete revolution of the sphere would define the fundamental unit of temporal existence. The amount-type of a partial revolution's extent, accordingly, would be some fraction of this time-unit.

For Plato, the possible fractions here would be those expressible as ratios of whole numbers (integers). The possible ratios with respect to one time-unit (revolution), then, would be one to two, one to three, one to four, *et cetera*, and hence the fractions one-half, one-third, one-fourth, and so on. I shall use one-half of one revolution as my illustrative instance.

Initially, at least, Aristotle's argument seems dubious regardless of which of these several ways we understand 'a part of the revolution is

also a certain time.' Consider (iii-a). This would have Aristotle alleging that a particular one-half extent of a particular revolution is also an instance of some extent of time; and inferring that this one-half of this revolution is therefore another (a different) extent, additional to the extent of the complete revolution of which it is a (one-half) portion.

But, if a particular revolution is the kind of thing which is also a particular extent of time, then one-half of that revolution would also be a particular extent of time. Since the motion of Plato's sphere is constant and unchanging, this one-half portion of the revolution would in fact constitute precisely one-half of that extent. It would be one-half of the time-extent delineated by the complete revolution. But this much seems just obvious and unobjectionable.

Whereas, it seems absurd to infer that a particular half-revolution portion of a particular revolution is something additional to the revolution itself, that it is a distinct "this" (*tis*). A particular one-half of a particular orange may in a way be additional to or distinct from the orange itself if it is no longer one-half of that orange. But if it has been separated from the orange's other half, the orange as such no longer exists. Rather, two liberated hemispheres of orange now exist in its place.

The difference between (iii-a) and (i) is that (iii-a) refers to the particular extent of a particular revolution (or partial revolution); whereas (i) refers to the revolution (or partial revolution) alone, without reference to its extent. Nevertheless, the same considerations seem applicable. That is, it seems trivial to observe that, if we posit that a particular revolution is a particular time, then a portion of it should also be considered a particular time. Whereas, it seems absurd to infer further that the latter would be something additional to the former.

The two other readings—(iii-b) and (ii)—do seem more plausibly taken to imply a genuine multiplicity with respect to time. The puzzle in their case, though, is why it would be a problematic, unacceptable multiplicity.

In the (iii-b) case, suppose that a revolution of the sphere defines a type of time-extent and that one-half of a complete revolution also defines a type of time-extent. These two types of time-extents are indeed two (different) types. But, why would this be objectionable? How does it differ, say, from specifying a complete solar year as one type of time-unit and some fraction of a solar year as another type of time-unit (for example, a calendrical month, or a climatic season)? We can

delineate time extents by counting years. We also can delineate time extents by counting months, or seasons. This seems just obvious. Why might it be problematic?

The difference between (iii-b) and (ii)—akin to (iii-a) compared to (i)—is that the latter expresses the more general idea that the sphere's revolution constitutes a type, kind, or species of time. Again, though, the same considerations seem applicable. If a complete revolution of the outermost sphere delineates a type of time (call it, say, *full-sphere-time*), then why not say that one half of a revolution also delineates a type of time (say, *half-sphere-time*)? Why anyone would travel this conceptual road may be a mystery; but why would it be problematic?

This initial critique of Aristotle's thinking, however, ignores crucial points. Perhaps chief among these is the simple fact that doctrine (I) is posited as an account of the reality of time. It specifies what temporal reality is—in particular, of course, that time is the motion of the outermost sphere.

If the outermost sphere did not move, Plato does clearly maintain, time would not exist. But, nor is the mere fact of its moving (and doing so circularly) sufficient to account for time. By itself, the sphere's motion is just that: motion, and more precisely motion which is circular. Rather, time in reality exists due to the repeating periodicity of the sphere's circular motion as it completes ("attains") one revolution, then another, and another, and on and on—what Plato referred to as 'numbers of time.'

Another crucial point is the argument's implicit premise that whatever warrants equating time with complete revolutions of the sphere should also warrant equating it with the likewise recurring partial revolutions its motions equally delineate. For, if so, then the reality of time should also be said to be one of these other repeating effects of its circular motion—one of the other "numbers of time." And, this does imply that time's reality is therefore multiple, that there are more than one time reality. This unacceptable consequence, moreover, seems to follow regardless of how we understand the phrase '[also] a certain time'.

Presuming doctrine (I) to express an understanding of Plato's account of time, the outermost sphere's recurring revolutions account for time's reality by constituting the fundamental (repeating) unit of temporal existence. This is the case, moreover, whether the doctrine intends [(i)] particular revolutions as they are delineated by the sphere's motion, or alternatively [(ii)] that the sort of reality time is is the sort constituted by revolutions of the outermost sphere.

Further, these revolutions would account for time's reality owing to their recurring periodicity whether this means [(iii-a)] that the sphere's particular (actual) revolutions constitute the real units of temporal existence, or alternatively [(iii-b)] that revolutions of the outermost sphere define the unit-type which constitute the fundamental unit or "measure" of temporal existence.

Consequently, earlier remarks that (i) and (iii-a) yield at worst trivial multiplicities, and that (ii) and (iii-b) yield at best unproblematic multiplicities, were unjustifiably optimistic.

But, why should a proponent of doctrine (I) accept that time must also be identified with partial revolutions, or their extents? In numerous cases, what is true of a whole is not true of its parts. Why in this case should the warrant for equating time with the sphere's revolutions warrant equating it also with portions of those revolutions?

Doctrine (I) intends that the sphere's (complete) revolutions are the only real unit(s) of temporal existence. Any hypothetical other units can only be multiples or fractions of that unit—units derivable from it by mathematic operations. A proponent of doctrine (I) might even counter Aristotle's criticism by arguing: Time is the outermost sphere's motion as it delineates complete revolutions. A partial revolution is not a complete revolution. Therefore, time is not any of the partial revolutions it delineates along its orbital way.

Two Aristotelian principles, however, may clarify his thinking here. The first is that the unity or oneness of time consists (at least partly) in its universality; and its universality depends (at least partly) upon its ubiquity. Perhaps, accordingly, Aristotle is just incredulous that time could be a revolution yet not portions of a revolution.

Even allowing the doctrine that time is the sphere's revolutions, how could it not also exist equally and everywhere throughout each of those revolutions? Doctrine (I) may in a way be correct, for example in that the real existence of time only reveals itself in nature's periodicities (the outermost sphere's revolutions being the primary and most exemplary of these). But, how could its revolutions define the fundamental unit of time if its circular motion is not as such temporal from its outset?

This rationale is consistent with Aristotle's own thinking about time. As argument against doctrine (I), however, it begs-the-question. The Platonic approach considers time's reality to reside in nature's periodicities. Doctrine (I) asserts that the outermost sphere's celestial orbits is primary among these. All other periodicities depend on it, and perhaps (in theory) are mathematically derivative from it. Aristotle's ubiquity

principle is indeed fundamental to his own approach; but its implicit denial of the Platonic approach does not clearly constitute an argument against that approach.

A second Aristotelian principle seems more logically germane. The one premise Aristotle explicitly provides states: "for, what is attained is part of a revolution, not a [complete] revolution." This invocation of *attainment* is crucial. Aristotle maintains that the real existence of a motion depends on its having a real beginning or onset, and a real ending or culmination—more technically, a start-terminus and an end-terminus; and these also delineate the sort of motion it is. (We will see reason to modify this somewhat in connection with Book VI of *Physics*.)

The outermost sphere's motion is a circular motion precisely because it is the sort of motion which transcribes (complete) circles, which arrives at ("attains") a terminus 360 arc-degrees from the terminus whence it began. Moreover, this motion is the origin and the exemplar of all natural motion. Its unceasing delineation of one (perfectly circular) revolution after another is the perfect motion, and all other motions within our cosmos (and their periodicities, or rhythms) owe their existence to it.

Aristotle observes, however, that in the course of its motion the sphere also attains partial (whole fractional portions of) revolutions. When the sphere (more precisely, a fixed star, or a constellation resident on the sphere) finds itself, say, 180 arc-degrees from its hypothetical start-terminus, why is this not also an end-terminus?

As Aristotle's premise indicates, at 180-degrees from its start-terminus the sphere also attains something; and what it attains terminates a certain real portion of that motion. Indeed, the sphere will proceed from there and attain another 180 arc-degree terminus, then another one, and on and on. Inasmuch as 180 arc-degrees is in fact one half of a complete circle, then, we may say that the sphere therein attains a half-revolution; and it shall proceed to repeat this "attainment" unendingly. This half-revolution, according to Aristotle, therefore has as much claim to real existence and the moniker 'time' as do its complete revolutions—and likewise concerning its quarter-revolutions, eighth-revolutions, and so on.

Aristotle's one sentence summation of his second argument against doctrine (I) stated: "if the heavens were many, then time would be equally the motion of however many of them there are; and so many times would exist concurrently." This 'however many of them there are'

reflects debate concerning how many spheres are required to concord with the astronomical data (especially regarding "the wanderers"—the planets), or at least to approximate it as closely as possible. This particular debate, though, is not pertinent to Aristotle's argument.

We may presume for discussion that there are seven additional circles of motion nested within the outermost sphere (of the fixed-stars) corresponding to the Sun, the Moon, and "the wanderers": Mercury, Venus, Mars, Jupiter, and Saturn. In any case, Aristotle's implicit argument goes something like:

(1) If time is the motion of the whole celestial system, then it is equally the motion of each of its "many" spheres.
(2) In this case, then many times would exist concurrently.
(3) It is impossible for many times to exist concurrently.
(4) Therefore, time cannot be the motion of the whole celestial system.

Several preceding considerations regarding his first argument seem pertinent again to this argument. Two features of this argument, however, seem new and distinctive: First, while the inferential principle in premise (1) is similar to the corresponding principle in Aristotle's first argument (that if time is a complete revolution, then a part of the revolution is also a certain time), it also significantly differs from it. Second, this argument makes an explicit point of the resulting multiple times' implicit concurrence (*to hama*).

Premise (1) here may seem blatantly fallacious, though—akin to arguing: A clock's time-keeping function is a consequence of the relations and motions of its parts; therefore, a clock's time-keeping function is a consequence of each of its parts. And yet, despite the image of the Platonic cosmos as a Great Clock, the celestial system and an actual clock are disanalogous in significant ways. Two are:

The parts of a clock perform no time-related functions themselves. Rather, the entire clock, as a functional whole, performs certain time-related functions. For example, it analogically or digitally displays hours, minutes, seconds, maybe days and dates. It executes these functions because of the interconnected workings of its parts. Individually, though, its parts are just that: parts of a (whole) clock.

The Heavenly spheres also interrelate. The outermost sphere's motion is the originative source of all natural motion. This includes the motions of the inner spheres, although the outermost sphere's motion (of the Same) is altered by the motion of the Different to yield the inner

spheres' divergent planes of motion from the celestial equator and each of these inner sphere's motion has its own speed.

The spheres and their motions are mathematically related to one another. Still, with respect to time the spheres function independently. Their temporal relations to one another are mathematical and not mechanical. Consequently, premise (1) may be read as a variant of the first argument's thesis that whatever warrants equating time with the outermost sphere's revolutions should also warrant equating time with … [here replace 'its partial revolutions' with 'the revolutions of the other spheres'].

Second, a clock executes its temporal functions—for example, displays temporal information—derivatively and by fiat. However much society collapses time into time-keeping, the two are still in fact different. Whereas the Platonic approach sees celestial motion (and its periodicities) as itself establishing time's reality.

Unlike a clock, the Platonic Heavens is not related to time as something distinct from, conceptually prior to, its constitutive spheres' motions. We may discern other systemically emergent, derivative types of time-units. But time itself, according to doctrine (I), in reality exists only by virtue of the Heavenly spheres' recurring celestial orbits. Insofar as there is a multiplicity of these, accordingly, a corresponding multiplicity of times would indeed exist.

Perhaps, though, this ignores an important fact concerning the Heavenly circles of motion. They are all equally and perfectly circular. In this respect, they do not differ. They differ in astronomic distance from the material center of our cosmos (Earth). But this is a spatial difference. So, too, are differences of their orbital planes. They also differ in their speeds. Ultimately, though, the only difference which seems pertinent to time are their differing resultant periodicities. For example:

> The moon takes a lunar month to return to her original position; the sun a solar year and Venus and Mercury the same (on the average); Mars 1 year plus 322 days; Jupiter 11 years plus 315 days; Saturn 29 years plus 166 days. [Vlastos, 33]

Stated this way, their differing periodicities presuppose a single temporal mathematics. Still, this passage indicates that the spheres' multiplicity with respect to time is a matter of their differing orbital periodicities.

The spheres' salient multiplicity for Aristotle's argument thus seems to lie in the fact that their differing orbital periodicities would render

them, not only different instances of time, but also differing sorts of time (units). For example, if we designate a Venusian revolution as time's fundamental unit, we are on Venus-time; whereas, if we accord this designation to a Saturnian revolution, we would be on Saturn-time. But why should this be objectionable?

Perhaps the key to Aristotle's thinking is the argument's second distinctive feature, its invocation of *concurrence*. Why, according to premise (3), is it impossible for many times to exist concurrently? What sense of 'concurrent' might warrant this premise?

Translators commonly render Aristotle's use of '*hama*' here to mean simultaneous(ly). Aristotle is indeed well aware that '*hama*' can have a distinctly temporal meaning. For example, elsewhere he makes this explicit by invoking more fully "concurrence with respect to time" (*to hama kata chronon*). Since time is his topic here as well, it is plausible to suppose that Aristotle's premise does intend a temporal concurrence. Indeed, Aristotle had recently argued the impossibility of different nows existing "concurrently with respect to time." Perhaps, then, his idea here is similar.

The two contexts, however, are significantly different. In that earlier discussion, time and the now were not anchored to anything in particular in the real cosmos. The now debated there was intrinsically related to the temporally unreal—to past and future; and it was this relationship which gave rise (and meaning) to Aristotle asserting the necessary nonconcurrence of different nows (of that sort).

This, however, is not doctrine (I)'s context. Doctrine (I) in effect bypasses pastness and futurity considerations (and so also the Parmenidian argument) and takes a different approach. In so doing, it anchors time in quite real natural existents: the incessantly orbiting celestial spheres, or their incessant orbitings.

Translating Aristotle to mean simultaneity in the present context is dubious anyway. Arguably, simultaneity has no meaning, or else is vacuous, when applied to existents (and their motions) which always have and always will exist. It may, however, be meaningful to attribute concurrence to them in another sense of synchronicity. The motions of the spheres are immutably related to one another such that knowing where a particular celestial body (for example, Venus) is in its circle of motion and knowing how long it has been since the current Great Year began should allow one to calculate where any other celestial body (for example, Jupiter) is in its own circle of motion. Like parts of the proverbial well oiled machine, the spheric constituents of the Heavens

are supposed to be always (indeed immutably) moving perfectly in sync with one another—whatever the precise character of that "sync" might be for the various spheres.

What Aristotle's argument needs is a rationale for claiming that this synchronicity of the spheres is a temporal synchronicity (even if not simplistically just simultaneity as such). Such a claim would then seem to require there to be a single more encompassing and universal reality to time (perhaps even what Aristotle has already alluded to as indefinite time), in virtue of which the spheres' synchronicity with respect to time is real (and discernible).

Arguably, doctrine (I) would then imply that the multiple reality time is in virtue of the differing periodicities of the spheres nevertheless are (temporally) concurrent only in virtue of that one more encompassing reality of time. But, this is impossible. The reality of something cannot be both not a (single) reality (but a sundered multiplicity of diverse realities), and yet still also indeed a reality. Such a rationale might be provided by arguing that the spheres' synchronicities presuppose duration (temporal extent) and not just serial location and distance (spatial order and extent) with respect to the natural order of existents commencing at the onset of a Great Year.

A Platonist might argue that knowledge of how far a celestial body has moved since the current Great Year began is sufficient, combined with the relevant geometric knowledge concerning its and other celestial bodies' cosmic circuits, to demonstrate their synchronicity. Minimally, though, one could respond that this requires information also about their velocities (or at least speeds); and velocity (likewise speed) presupposes time.

Moreover, it also would be simpler to devise calculation procedures utilizing *how long ago* as the salient information concerning the current Great Year's onset. And *how long ago* is a temporal (durational) phenomenon. In this way, it would be proper, and not question-begging, to argue that time could be the motion of the whole celestial system only if time has a logically prior primary (or, perhaps, universal) reality in virtue of which the spheres' motions are not only circular but also temporal from their outset.

5.II. *Time as the Cosmos Itself*

Aristotle's retort to doctrine (II), that time is "the sphere itself," is even more cryptic. He doesn't even directly challenge the doctrine itself. Instead, he diagnosis its proponents' evidential inspiration and condemns the basic reasoning implicit to their approach. He argues:

> Those who proposed that time is the sphere of the whole did so, evidently, because all [natural] things exist in relation to time and also within the sphere of the whole. But, this approach is too simplistic for us to bother describing the absurdities implied by it. [IV.218b5–8]

We do not know whether Aristotle is speculating, or is reporting known information about "those who proposed…" The primary issue, in any case, is what 'this approach' references and why it is "too simplistic for us to bother …"

Arguably, what Aristotle has in mind by "this approach" is not simply its proponents' recognition that everything natural is temporal and is also contained within the spheric boundary of our cosmos. For one thing, Aristotle agrees with this. He also maintains that everything natural is temporal and also is contained within the spheric boundary of our cosmos. For another, we shall see that he does not dismiss doctrine (III) so perfunctorily, though it is rooted in this same recognition.

Nor could Aristotle intend "this approach" to reference just the doctrine itself. This would render his thinking indecipherable. It would have him simply asserting that the doctrine is so simplistic that it directly implies a number of absurdities without providing any clues whatsoever what those absurdities are or why it implies them.

It is more reasonable to suppose that "this approach" refers to an implicit mode of reasoning which Aristotle is alleging the doctrine's proponents rely upon to infer it from their evidential inspiration for it. Aristotle need not stipulate any of the absurdities implied by their reasoning because, he maintains, it is simplistic in a manner readily seen to allow for an indefinite number of absurdities.

As I understand Aristotle's retort, he in particular has in mind that the implicit mode of reasoning behind doctrine (II) commits a simple-minded (evident) logical error. Its proponents recognize axiom (A), that natural existents are all temporal existents. They also recognize that natural existents all exist within the confines of the outermost Heavenly sphere. Another way to state these two points is that natural existence is temporal existence and natural existence also is the spherically

shaped whole of nature. As Aristotle sees it, doctrine (II)'s proponents simplistically infer from these two (individually correct) points that temporal existence (time) therefore is the Heavenly sphere (the spheric cosmos).

We can see this reasoning's erroneous character by expressing it symbolically. Its logical form is: A is B; A is C; therefore, B is C (A = natural existence; B = temporal existence; C = the cosmic sphere, or the spherical cosmos). But this form of reasoning allows an indefinite number of results which anyone (presumably) could see are absurd. For a couple examples: The sun is round; the sun is hot; therefore, (what is) round is hot. Or, marriage is difficult; marriage is sacred; therefore, (what is)difficult is sacred.

Of course, showing that a certain mode of reasoning is fallacious does not also refute its conclusion—here, doctrine (II). But it does place a substantial burden of proof on its proponents.

5.III. *Time as Motion and All Change*

Aristotle's presentation of certain main challenges to time's reality (discussed in Chapter 4) is central to establishing context and introducing some notions and principles pertinent to his own account of time. The same may be said about his critiques of "previous doctrines" of time. In this regard, a conceptual progression of sorts may be discerned in the three doctrines.

Doctrine (I) introduced a fundamental link between time and motion. In Plato's view, it is only because the Heavens move that they are distinguishable from eternity, and such that the time they generate constitutes, however, a "moving image of eternity." Because the Heavens move, moreover, all natural existents consequently move or change as well. These derivative motions and changes may have their own rhythms, their own periodicities. Doctrine (II), though it continues doctrine (I)'s focus on the sphere(s), thus asserted a more general relationship between time and everything in the natural cosmos.

Doctrine (III) in a way synthesizes the linkage between time and motion, and between time and all things natural. In summary form, doctrine (III) stated that time is "motion; that is, any sort of (*tis*) change" [IV.218b9]. Doctrine (I) identified time with the orbital motion(s) of the sphere(s). But motion with respect to place (locomotion) is but one sort of motion. Aristotle more generally thinks of motion as dynamically

conceived change of any sort. Doctrine (III), accordingly, equates time with, in effect, the totality of all (and every kind of) natural change. It does not limit it to locomotion, much less to the particular locomotion(s) of the Heavenly sphere(s).

Aristotle's critique of doctrine (III) yields further insight into his context and thinking about time. He provides two arguments against doctrine (III). The first [IV.218b10–13] may be articulated as follows:

(1) A particular existent's motion or change exists just in the thing which moves or changes, or just where the moving or changing thing happens (*tychei*) to be.
(2) Time exists equally everywhere (*pantaxou*) and in consort with everything (*para pasin*).
(3) If (2), then time cannot exist just in the thing which moves or changes, or just where the moving or changing thing happens to be.
(4) Therefore, time cannot be a particular existent's motion or change.

Aristotle might have proceeded from premise (1) to argue, as he did against doctrine (I), that this implies a (problematic, unacceptable, even absurd) multiplicity of time realities. Instead, premise (2) takes the discussion a new direction. It, in particular, explicitly appeals to Aristotle's ubiquity principle. Insofar as doctrine (III) may be partly motivated—as Aristotle opined concerning doctrine (II)—by the Greek axiom that everything natural is temporal, that appeal now seems clearly proper, and not question-begging.

Premise (2) makes it clear that Aristotle thinks it is always a mistake to equate time with particular natural existents as such (or with where, cosmically speaking, they happen to be). He himself avoids this mistake by having premise (2) state, not that time is everything natural, but that it exists "in consort with" ('together with', 'alongside of', 'conjointly with', would also translate '*para*') every natural existent. Time might not exist apart from natural existents; but nor, if it is as such to have real existence, can it be just conflated with natural existence.

Premise (2) may in fact intend more than my rendering suggests. It asserts that time exists equally everywhere. The term for 'equally' is *homoios*, which can also mean, for instance, '*in the same way*' or '*in a like manner*'. In these terms, this premise's appeal to Aristotle's ubiquity principle says more than that time is in some sense everywhere, and so related to any and all things natural. It further states that time must

be, remain, and function the same everywhere, with respect to every natural denizen, constituent, or phenomenon.

Aristotle second argument [IV.218b14–18] may be read to develop this theme. It argues:

(1) Motion or change exists (occurs) more quickly or more slowly. (It occurs at various rates.)
(2) Quick and slow are delineated (*horistai*) by reference to time, inasmuch as *quick* denotes something's moving much in a short time and *slow* denotes something's moving little in a long time.
(3) Time is not delineated by reference to time, since it cannot somehow be a certain amount of itself (for example, much or little of itself), nor somehow a certain type of itself (for example, quick-time or slow-time).
(4) Therefore, time does not exist (or occur) quickly or slowly.
(5) Therefore, time is not motion—that is, change.

Initially, this argument seems straightforward. Its strategy identifies an inherent feature of motion and change which makes no sense when thought of as a feature of time as such. But, since doctrine (III) means to equate time with (all) motion and change, something inherent to motion and change must likewise be such a feature of time.

This strategy differs from the "simplistically absurd" reasoning Aristotle attributed to doctrine (II)'s proponents. Here, Aristotle infers from the alleged identity of time with motion and change that an inherent feature of the latter is also a feature of the former (as when Clark Kent has X-Ray vision because Superman does). Whereas in the previous context, the identity of time with the spheric cosmos was inferred from each being related to a third thing (as if I were my sister because my sister and I have the same parents).

The feature this argument claims makes no sense when ascribed to time as such is stated in premise (1). The reason for the absurdity is stated in premise (3). This latter premise, though, may not be as straightforward as it initially seems.

The claim that time cannot be a certain amount of time is by no means obvious. Indeed, premise (2) claims that time does, for example, come in "long" amounts and "short" amounts. Aristotle himself has claimed that time "as we always encounter it" is always some determinate extent of time. What would an amount or extent of time be an amount or extent of if not of time?

Nor is it obvious that time cannot come in types, including in the sense of quick(er) and slow(er) types of time. And, while "time is not delineated by reference to time" has a ring of obvious sense to it, it in fact is not obvious what that sense is. Isn't distance in a quite meaningful sense delineated by reference to itself (distance)? Light by reference to light? Happiness by reference to happiness? Why would such a formula be nonsensical in time's case?

To unravel Aristotle's intent, note that premise (3) seems in a way stated backwards. Aristotle wants the claim that time cannot be a certain amount of itself (for example, much, or lots-of, time; little, or not-much, time) to partly explain why time cannot be delineated by reference to itself. Perhaps he could have expressed this more clearly by stating instead: time cannot be a certain amount of itself (nor a type of itself) because it cannot be delineated by reference to itself.

It surely seems reasonable to say that something's temporal existence (and extent) is delineated by reference to time. 'Achilles runs far' and 'Achilles runs quickly' are not synonymous. As Aristotle sees it, '…runs quickly' in a way says something more than does '…runs far'. In particular, it adds to the notion *running far* the notion *in a short time*. This added meaning delineates the same natural existent—Achilles, or his running—but distinctly with respect to its temporality, distinctly as it relates to time.

The question, then, is whether 'delineated with respect to time' makes sense when it is not a natural existent's temporality that is being delineated but somehow just temporality as such. It indeed seems trivially true that what an amount of time is an amount of is time. Likewise, it seems trivial to say that what an amount of distance is an amount of is distance, what an amount of light is an amount of is light, and so forth. But in fact distance is not delineated by reference to distance; rather, the distance Achilles runs (how far he runs) is. Nor is light's intensity in fact delineated by reference to light; rather, the intensity of some light source (for example, a candle, Sol) is. Distance is delineated instead by reference to a certain measure or, more generally, a certain pair of delimiting termini. Light is delineated instead by reference to a certain measure of luminance. Likewise, Aristotle claimed earlier, time is delineated by reference to a pair of (different) nows.

What time is, apart from some (de)terminated amount of it, is just time. Time as equally and everywhere the same with respect to natural existence—what Aristotle earlier termed 'indefinite time.' Only insofar as this time is real does it make sense to say that what an amount of

time is an amount of is time. A minute is an amount of the same thing that an hour is an amount of. A day is an amount of the same thing that a year is an amount of. A minute of time is not an amount of something different from what an hour of time is an amount of. A day is not an amount of something different from what a year is an amount of.

Determinate time presuppose the reality of time as such—its universality, its ubiquity, its as-such indefiniteness. Arguably, this time cannot be a certain amount of itself. A certain amount of this time may indeed be delineated. But this results in a certain determinate amount of time. What results no longer is this indeterminate time. Since what is determinate is not indeterminate, indefinite time can never be an amount of itself. It cannot be much or little of itself. It cannot be lots or not-much of itself. Because then it would not be itself.

We can make this more precise in terms of the philosophical distinction between *mass* terms and *sortal* terms. An example of a mass term is 'water'. Why is 'water' a mass term?

The classical Greek philosopher Anaxagoras proposed a criterion. Anaxagoras considered mass terms names designating what he called *seeds*—where something is a seed if (and only if) dividing it yields two instances (pieces, chunks) of the same thing. Whereas the denotations of sortal terms cannot be divided and remain the same thing—much less divide into two instances of the same thing. Instead, division in fact destroys them.

Divide a body of water—for example, erect a boundary through the middle of a lake, or pour a portion of the water in one container into another container—and the result would be two instances of what is still water. The stuff on either side of the wall remains water; and the stuff in each of the two containers, likewise, is still water. Thus, 'water' is a mass term.

On the other hand, dividing a human being in half does not yield two instances, each still a human being. Indeed, the human being would be destroyed. The result would be two pieces of corpse which together used to comprise a human being. Thus, 'human being' is not a mass term but a sortal term.

One way to understand Aristotle's appeal to his ubiquity principle of (indefinite) time is to think of 'time' as a mass term. Anaxagoras' criterion also incorporates his view that his seeds are in fact unendingly divisible. His criterion intends that two instances of the same thing result no matter how many divisions are executed or envisioned, no matter how itsy-tiny the chopped-up chunks of seed-stuff become.

Anaxagoras is not an atomist. Nor is Aristotle, including in regards to time. In his criticism earlier of doctrine (I), Aristotle likely would see that doctrine in fact to imply an unending number of time-realities inasmuch as the circular motion of the spheres may be unendingly divided into smaller and smaller portions of a celestial orbit. The universality aspect of Aristotle's understanding of time's cosmic ubiquity, accordingly, insists that time exists as such everywhere throughout the natural cosmos.

The name of a certain amount of time, in contrast, does not function as a mass term, but instead as a sortal term. Dividing an hour does not yield two hours—two amounts of time which each is still an hour. In this respect, the distinction between (indefinite) time and an amount of time may be compared to the distinction between (non-atomistic) water and a container of water. A portion of the water in a container may be poured into another container, yielding two instances of water. But the water container cannot itself be equivalently divided. Dividing, say, a one-gallon container of water does not yield two one-gallon containers of water.

Looked at this way, Aristotle's insistence that time cannot be a certain amount of itself becomes clearer. An hour of time is not an amount of anything other than time, just as a gallon of water is not a gallon of anything other than water. Moreover, the amount of time which such a certain amount of time is is indeed an hour of time, just as the amount of water a certain amount of water may be is indeed a gallon of water. But, just as it would be a semantic confusion to claim further that water as such may therefore be a gallon of itself, so too would it be conceptually wrong to claim that time as such may be an hour of itself—or, generalizing, that time as such may be long or short, lots or little.

In some semantic cases, perhaps, an amount of time may become more extensive or less extensive. For example, if my designation for a certain amount of time is the sortal term 'the time I wait in my doctor's office', the time this term denotes may become increasingly more (or longer); and, similarly, the time denoted by the sortal term 'the one-hundred meter dash record' may become shorter (or less). But in these cases it is, rather, the amount of time which may be longer or shorter, more or less; not time as such—not time as the (indefinite) reality of which that amount is an amount.

Arguably, though, there is one respect in which it may make sense to talk, for example, about water being more or less, much or little of itself. The classical philosopher Empedocles introduced the notion that

certain stuffs (for him, elemental air in particular) may become denser or rarer, more concentrated or more rarified. As for example in the case of luminosity (light intensity), this would seem still to be talking about a certain type of amount of something (for example, water or air). Nevertheless, it also seems to make sense to think of the stuff itself therein becoming more (or less) of itself. It does suggest that something else or more is going on with the stuff itself than the Anaxagorean notion of its remaining itself regardless of how much or how little, how large or how tiny a chunk of it, there is. It seems as though, in some way, the stuff itself increases (or decreases).

In time's case, the relevant sort of respect would likely be that expressed by the adverbs 'quickly' and 'slowly'. Accordingly, why contrary to Aristotle's premise (3) cannot (even indefinite) time be as such (comparatively) quick(er) or slow(er)? It seems normal to think of quickness and slowness as a function of rates of motion, and in particular as quantifiable features of motion expressible as a ratio between two numbers or amounts. Premise (3) indicates Aristotle's awareness of this. Nevertheless, his initial description in premise (2) of these features seems as much qualitative as quantitative.

Arguably, such notions as 'moving much in little time' and 'moving little in much time' seem as much experiential in meaning as, perhaps, calculative. For example, as we observe the tortoise inch along while Achilles races toward the finish line, experientially Achilles indeed looks to be covering lots of ground in a short time while the tortoise just looks to be taking a long time not to get very far.

Experientially, in other words, a sort of dynamical version of unified space-time seems most descriptive of locomotion as we encounter (observe) it. As in the case earlier of Piaget's children (discussed in Chapter 3.2), a faster moving object can seem to be taking less time in moving towards its destination than a slower moving object even when in fact they differ only with respect to the distance they move in a given amount of time.

Similarly, cinematic-affects directors know that they can convey to the moviegoer the same sense of hyper-speed by portraying Superman's surroundings as if temporally slowed while he locomotes normally as by portraying him as if traversing blurringly huge chunks of distance while maintaining a normal sense of his surrounding environment's temporality. The two approaches yield equivalent results in the moviegoers' experientially based conceptions of what is transpiring within the cinematic reality projected in front of her.

Aristotle, though, is here objecting to this way of thinking. His 'moving much in little time' and 'moving little in much time' may have a qualitative ring to it; but Aristotle does seem intent, as premise (3) indicates, on conveying some sort of rate, and so ratio, even if fuzzily. Even if there is such a thing as *the speed of time*, accordingly, Aristotle might say that it makes no sense to say anything about its rate other than that it is whatever rate it is, and so just that its contribution to nature's dynamicism is everywhere the same. Arguably, in other words, insofar as there is such a thing as the speed of time as such, Aristotle seems to consider it a feature of time's ubiquitous universality, that it is everywhere and always the same (speed-of-time).

Perhaps, then, the gist of Aristotle's second argument against doctrine (III) goes something like:

(i) Every motion and every change must occur at some rate or other; and rates of motion or of change can vary (differ or change).
(ii) Hence, if time is motion and all change, then time must always occur at some rate or other; and its rate(s) of occurrence must be able to vary.
(iii) The rate at which something occurs is expressed by a ratio between a certain amount of what occurs and a certain amount of time (for example, fifty miles of locomotion in one hour, or thirty degrees of temperature change in one day) such that variations in that rate are expressed by one of these amounts varying while the other stays fixed.
(iv) Hence, the rate at which time occurs would be expressed by a ratio between a certain amount of time and a certain amount of time; and a variation in its rate would require a variation in one but not both of these amounts (concurrently).
(v) A ratio between a certain amount of time and a certain concurrently different amount of time is nonsensical (e.g. an hour per minute, or a day per year); and varying a time's amount while the time's amount stays fixed is impossible (e.g. an hour per hour quickening—or would this be slowing?—to two hours per hour, or twenty-four hours per day slowing—or would this be quickening?—to twelve hours per day).
(vi) Therefore, time cannot be "motion; that is, every manner of change."

In this rendition, premise (v) explicates why time cannot be delineated by reference to time (itself), after premise (iii) lays the foundation for why time therefore cannot itself be said to occur at some (or at least at any specifiably particular) rate, nor to vary in that respect.

Yet, do these premises (and their implications) in fact render the notion of a sort of speed to time entirely nonsensical, or at least ineffable? It may be that we can discern temporal speed (or velocity) only as it contributes to a natural existent's rate of motion. But this does not entail that time itself cannot be legitimately thought to proceed with more or less diligence. Premise (iii)—which means to render premise (2) in the original version of the argument more precise—remains debatable.

Plato's approach may be instructive here. His account of the generation of time supposes that, before the cosmos was divided and formed into various spheres, its progenitor first needed to form a primordial "circle moving in a circle" [Tim. 34b]. Part of the reason for this is that the various spheres (or circles of motion) constituting the Heavens need to move with various (different) degrees of "swiftness" [36d].

More precisely, Plato's cosmic progenitor needs to determine how "swift" (*taxos*, the same term Aristotle uses for speed or for velocity) each of the (inner) spheres needs to move, and it determines this by reference to that primordial motion which is instantiated as the outermost sphere. The progenitor needs to determine whether a given inner sphere is to revolve with equal swiftness, or with greater (or less) swiftness (and in this case by how much, by what comparative degree), compared to the outermost sphere's motion. Arguably, though, it makes no sense to talk this way unless this primordial circle of motion is not just moving but is itself moving with some manner of "swiftness."

Arguably, too, it even makes sense to conceive the primordial speed of time, the primordial temporal swiftness of natural existence, being different from what it in fact is—and so, at least conceptually, able to vary. Aristotle would likely just dismiss this suggestion outright. But, surely we can entertain the possibility of there existing two cosmoi which are identical in every way except with respect to the primordial speeds of their prototypical "circles moving in a circle," as Plato characterizes it. Akin to observers isolated within the inertial frames of contemporary Relativity Theory, the occupants of each cosmos would be unaware of this difference. Still, it nevertheless would surely constitute a real difference between the two cosmoi.

CHAPTER SIX

TEMPORAL COGNITION AND THE RETURN OF THE NOW

A common meditation technique fixes one's gaze on an uncomplex unmoving object, or with eyes shut fixates one's attention on a similarly simplistic and motionless image (perhaps a homophonic sound, or an imagined spot of light). The goal is to "still the mind," while "emptying" it of distracting intentional complexity. The simplicity of the real or the imaginary meditative object contributes to this end inasmuch as complexity tempts one's attention to shift among its diverse elements, whether as exacerbated by eye movement or in the wanderings of one's thoughts.

A fundamental characteristic of the inward psychical condition sought through meditation, moreover, is its seeming atemporality, its suspension of any sense of time—indeed, of temporal existence, or of existence as temporal—inasmuch as uninterrupted stillness resembles timelessness to human awareness. Despite his criticism of attempts to equate time with the natural cosmos and (or) its motions and changes, accordingly, Aristotle embarks on his positive investigation of time by insisting that "neither does time exist in the absence of change (or motion)" [IV.218b21].

This pivotal statement, and its significance, is missed by criticisms that Aristotle too closely associates time with motion. The Aristotelian thesis that without motion time would not exist does not imply that time does not exist when motion is absent—when something is at rest. Lodging this criticism against Aristotle is a red herring, confusing absolute place with absolute rest.

Absolute place exists for Aristotle in two respects: first, the geometric center of our cosmos and its outermost boundary (sphere) are as such unwavering, even immutable; and, second, the elemental constituents of the natural cosmos each have a "natural place" with respect to that cosmic center and periphery. This, however, is different from claiming that there are natural existents which may be entirely at rest, which are not moving in some manner or respect or other.

Aristotle rejects this latter claim. He recognizes that it is simply

false that there is ever a natural existent which is not moving in some manner or respect or other—where, recall, 'moving' includes every sort of change or alteration whatsoever. Absolute rest is, rather, a feature of Eleaticism.

Nevertheless, we might find Aristotle's approach to unearthing and establishing his thesis—that time does not exist in the (complete) absence of motion—surprising. Aristotle's explication of reasons for denying time's reality (discussed in Chapter 4) and his critiques of "previous doctrines" of time's reality (discussed in Chapter 5) had appropriately focused on time's real existence. Yet, his argument for his own current thesis focuses instead on human temporal awareness. He argues [IV.218b21–219a1]:

> Whenever our cognitive processes (*dianoiai*) do not change at all, or at least we do not notice that they have changed, it seems to us that no time has passed—as it seemed to those fabled to sleep among the heroes of Sardinia upon their awakening, since they conjoined the before-now to the after-now and made them one by eliminating what occurred in the meantime because they had no awareness of it. Just as, if the now were not different but the same and one, then time would not exist; so too whenever its real differentness goes unnoticed the time in between seems not to exist.
>
> Surely, inasmuch as we do not recognize that time exists just in case we do not delineate (*horisomen*) any change whatsoever—but instead the soul appears to abide in a singular and indivisible condition (*en heni kai adiairetoi*)—and we say that time has passed just in case we do perceive and delineate [some change], it is therefore evident that time does not exist in the absence of motion and change.

This seems, at first glance, to be a terrible argument. Its core inference seems to be:

(1) Insofar as our cognitive processes do not change, or else they do but we are unaware of their doing so, it seems to us that no time has passed. (Or, insofar as we do not delineate any change whatsoever, we do not recognize that time exists.)
(2) Therefore, in the absence of motion or change, time does not exist.

Two of this inference's more egregious errors seem to be:

It projects the premise's alleged connection between psychical process and our awareness of time's passing onto real existence. It seems in effect to claim: Since temporal awareness requires occurrent psychical

activity (indeed, apparently, also a degree of reflective awareness of that activity), time as such therefore requires motion (or change).

But this seems akin to claiming, for example: Since my perceptual awareness of the tree requires photonic stimulation of my retinal cells, the tree itself therefore requires illumination to exist. Of course, if 'illumination' just means photons and if natural existence and the existence of photons are necessarily entwined, then it would be true that the tree itself would in fact not exist if illumination did not exist. But, this is not what this claim would normally be taken to mean. More importantly, this interrelationship between a universe with photons and that universe itself surely does not depend on the existence of human retinas and their (occurrent) excitations.

Second, this core inference concludes something about time's (real) existence from a claim about time's passing. Aristotle does maintain that time is a sort of thing which must in some genuine sense "pass" if it is to be real. More precisely, he maintains, along with the Eleatics and other classical Greek philosophers, that the sense in which time "passes" must be explicable in dynamical terms. He has not yet explicitly argued for this doctrine, however.

Either this argument is indeed atrociously bad; or there must be more to it than may meet the eye. Just as pertinent, though, is what it can tell us regarding Aristotle's conception and account of time.

Aristotle's notions here of the before-now (*to proteron nun*) and the after-now (*to hysteron nun*) are not meant to distinguish, for example, the time (or what has transpired) before now and the time (or what has transpired) after now. In this were the case, the now in question would most plausibly be the now when the heroes of Sardinia conjoin these into one upon their awakening; but then "before now" would include the time prior to their awakening when they were asleep, and so the argument would make no sense.

Rather, the before-now and the after-now here relate to the time when they were asleep. More precisely, the before-now relates to their commencing to sleep (whereupon they were no longer awake) and the after-now relates to their awakening (whereupon they were again awake). In Aristotle's argument, these two nows thus constitute or designate the termini of the heroes' slumber (of "what occurred in the meantime," while they slept) and, accordingly, also of that determinately extended stretch of time which, despite their unawareness of it, nevertheless lapsed in between their commencing to sleep and their awakening.

Aristotle, recall, previously presented an argument (discussed in Chapter 4) against positing that the now is always different-and-again-different. That previous argument, however, portrayed the now's putative differentness as a continuous sequence of nows delineating past and future as the parts of (indefinite) time as such. Here, though, Aristotle implies that the distinction between the before-now and the after-now denote a real difference (*heteron on*). In particular, Aristotle here relates the now to the termini of a determinate extent of time which lapsed during the heroes' slumber. The (real) differentness Aristotle posits here thus contrasts instead with the context of the other argument he presented previously, against the now's being entirely just one-and-the-same.

It is perhaps even more crucial to understanding Aristotle's current argument that the heroes in his scenario were mistaken. Time had indeed (e)lapsed and (many) things had in fact transpired during their slumber. Otherwise, the putatively different nows designated here as the before-now and the after-now would not in reality be different, and the heroes would not be mistaken in having "made them one." The scenario thus in fact contrasts the heroes' cognition of time's passage with time's real passage. But, then, in what way does Aristotle intend this argument to relate time to motion and change, as opposed to relating just temporal cognition to motion and change?

There also, though, is a possible ambiguity concerning precisely what motions and changes (or what sorts of motions and changes) Aristotle does intend in the argument. Arguably, the motions and changes pertinent to time's (real) passing while the heroes' slumbered were motions and changes in the natural environment (including their own bodies) surrounding them in their repose. What transpired during their slumber was not the passage of time somehow just by itself, somehow apart from the natural universe. What transpired, rather, were many many real things—most assuredly, the numerous continuing processes of nature.

Accordingly, it would indeed seem reasonable to suppose that Aristotle intends to claim that the heroes failed to recognize that (a certain extent of) time had passed while they slumbered because such deep-sleepers are unaware of their surrounding environment, of what is transpiring around them (indeed, including in their own bodies). And yet, Aristotle does not seem to claim this.

The argument begins with reference to our own cognitive processes and supposes that they do not change at all—or that, at least, we are

not aware of them changing. Accordingly, it seems reasonable to suppose that Aristotle posits that the slumbering heroes failed to delineate "any change whatsoever" inasmuch as, so far as they were concerned, their own "soul appear[ed] to abide in a singular and indivisible condition." Regrettably (or perhaps luckily) they apparently did not even have dreams to occupy them, to provide them with at least some sort of awareness or cognitive activity. They not only were unaware of their surrounding environment. They also were not at all self-aware. They were not aware even of, or in virtue of, any processes attributable to their own souls. They were thus entirely, completely unaware.

It does not follow from this, however, that Aristotle is not still also concerned with the fact that these heroes were unaware during their slumber of their surrounding environment and whatever transpired there. The point of emphasizing their (self-)apparent lack of all awareness whatsoever seems to serve the purpose for Aristotle of insisting and emphasizing that they indeed did not delineate any change whatsoever—including (but not only) in regards to their own selves or souls.

That this indeed is Aristotle's intent is confirmed by his continuing discussion, wherein he in fact argues for a stronger conclusion than just that time does not exist "in the absence of" (*aneu*) motion and change. This follow-up argument [IV.219a3–9] may be laid out as follows:

(1) Even when it is dark and we are not experiencing affections (*paschomen*) by virtue of the body [for example, visual or auditory sensations, perhaps tickles or itches], so long as some sort of motion seems nevertheless to have occurred in the soul it will concurrently (*hama*) seem to us that some time has passed as well.
(2) Conversely, whenever some time will seem to have passed some sort of motion will concurrently (*hama*) seem to have passed as well.
(3) Therefore, we perceive (*aisthanometha*) motion and time concurrently.
(4) Therefore, either time is motion or it is something whose existence pertains to motion.
(5) Time is not motion.
(6) Therefore, time is something whose existence pertains to motion (*tes kineseos ti estin*).

Here, step (5) harkens back to Aristotle's argument (discussed in Chapter 5) against the doctrine that time is "motion or any sort of change."

Nevertheless, as with Aristotle's previous inference concerning the slumbering heroes, this argument still begs us to question: Why or how does the fact (let us suppose) that this is the way things seem to be justify his inferring in step (4) that this is the way things are?

Perhaps in this argument, though, the answer is due at least partly to the mutual concurrence between time and motion asserted in (1) and (2), which step (3) claims implies that time and motion indeed do always exist concurrently at least with respect to perception (*aisthesis*).

Still, conclusion (6) seems meant to assert a stronger (indeed, a universal) claim concerning time and motion than the conjoint relation to perception inferred in (3). This generalization might be warranted, though, if for example time's relation to motion *only reveals itself in or by virtue of human cognition*, and particularly perception. That is, in more Aristotelianesque terms, perhaps the actuality of time's relation to motion only exists or manifests itself in virtue of our temporal awareness.

In any case, Aristotle immediately builds on his conclusion that time is something whose existence pertains to motion in a way which does explicitly relate time to motion generally (and not just to our own psyche's "motions"). He in effect argues [IV.219a10–14]:

(1) What is moved is moved from something to something.
(2) Therefore, every movement is a motion from something to something.
(3) Inasmuch as it is from something to something, every motion is related to some magnitude.
(4) Every magnitude is continuous.
(5) Therefore, every motion is also continuous—concordant with (*dia*) its magnitude.
(6) Howsoever much (*hose* …) the motion extends, it always seems (*dokei*) that just so much (… *tosoutos*) time has passed as well.
(7) Therefore, time is thereby also continuous—concordant with (*dia*) the motion.

Ostensively, this argument intends to establish the continuous (*synexes*) nature of time, or at least of any given stretch or determinate extent of time. Aristotle might, however, also be explicating at least one way in which time (according to the previous argument) pertains to motion—in that its own continuousness in fact derives from or "concords with" a given motion's continuousness, or its continuous magnitude or extent.

(This would explain why, as we saw earlier, it is very difficult, if not impossible, to make sense from Aristotle's perspective of such notions as *much motion in a short time* or *little motion in a long time*.)

Even so, it is unclear how Aristotle intends that we understand the relationship asserted in step (6) between magnitudes or extents of motion and amounts of time. Surely he is aware that he is asserting a relationship between two very different sorts of things. Indeed, proverbial apples and oranges seem more comparable than extents of motions and amounts of time. Nevertheless, step (6) seems intent, minimally, on alleging some sort of systematic and at least *quasi*-quantitative comparability between them.

On the other hand, it is relevant to recall cautionary discussion in Part I concerning blithely projecting modern notions of temporal extents and quantities onto classical discussions. Examples of the sort of relationship step (6) intends to warrant might thus include: The time it takes to walk to Corinth. The time from one new moon to the next new moon. The time it takes to poach an egg. The time Achilles takes to run one-hundred meters. The time for which a woman is pregnant.

Perhaps more important, though, is Aristotle's seemingly abrupt departure from focusing on motions or changes "in the soul"—psychical processes which may occur even when, at the very least, our sensory organs are not being stimulated by the surrounding environment—to focusing on motions and changes as these would seem most obviously exemplified in the surrounding (natural, physical) environment.

Aristotle intends his conceit of motion's "from something to something" character to apply to every sort of motion, change, alteration, process, activity, or the like. For every motion (or *et cetera*), there is a whence of its commencement and the whither for its culmination. Aristotle, though, does seem to consider motions from one place to another place (locomotions) as most illustrative of this characteristic of all motion. In this regard, moreover, this argument in a way returns us to Aristotle's scenario concerning his slumbering heroes. For, as we saw, the time which is there presumed to exist, and whose termini and passage escapes the heroes cognizance, is most assuredly time as it pertains to their surrounding ("outward") environment.

Arguably, too, though our slumbering heroes might have been aware that time was passing so long as they remained aware at all, they could not be aware of how much time was passing while unaware of their natural environment and various of its motions and changes. Were they

not entirely unaware (but were at least, for example, dreaming), in other words, they likely would not have simply "conjoined the before-now and the after-now and made them one by eliminating what occurred in the meantime." However, they just as likely still would have lacked any sense (awareness) of how much time was passing between the before-now and the after-now.

Inasmuch as cognitive or other psychical activities and processes "in the soul" are themselves natural (and they do, for Aristotle, occur also "in nature"), they surely take time as well. Consequently, it is reasonable to suppose that insofar as one is aware of them occurring (or, perhaps even just insofar as they do occur), he may be aware of time's passing. He is not, however, on that account also aware of how much of time is passing. Indeed, Aristotle's current argument asserting time's relationship to magnitudes of motion—including in step (6) regarding how time "seems" to us (*dokei*)—seems related to a general understanding on Aristotle's part of temporal cognition as developing and maturing only in association with motion and change in our surrounding environment.

Still, in one of the several places in *On Sense Experience and Sensible Objects* where Aristotle argues against the notion that time, or certain amounts of time, could be imperceptible (*anaistheton*), he seems to argue this regarding our awareness of our own selves and cognitive processes as much as regarding our awareness of other, or external, things or processes. Aristotle argues, in particular [*On Sense* 448a26–448b7]:

> When a person perceives something pertaining to oneself or to another thing during a continuous stretch of time, one is not at the same time incapable of recognizing that it [one's self or the other thing] exists. Yet, if there exists during this continuous stretch of time a certain time of such a [minute] size as to be entirely imperceptible, then clearly a person could not recognize at that [imperceptible] time whether one exists and even if one is seeing and perceiving.
>
> Moreover, if [we insist that] a person nevertheless does still perceive [at that imperceptible time], there would be neither a time nor a state of affairs (*pragma*) which one could perceive or during which one could perceive—unless it is not the case that one is therein seeing [perceiving] during some stretch of time or seeing [perceiving] some state of affairs inasmuch as there [supposedly] exists a certain magnitude of time and of the state of affairs which is entirely imperceptible by virtue of its minuteness. For, when we see the entire state of affairs and perceive the continuously same time, we do not somehow do so by virtue of the nows associated with them.

Aristotle's argument here against the existence, or even the possibility, of imperceptible time divides into two parts.

The first part argues that, if there existed within a given stretch of time a time too minute to be perceptible, then one would be unable to recognize at or during that imperceptible time whether the object of his perception exists at or during that time; and this contradicts the argument's opening claim that when one perceives something—whether something related to oneself (for example, his own perceptions) or related to something other than oneself (for example, something's magnitude)—for any continuous stretch of time whatsoever, one is likewise capable of recognizing during that same continuous stretch of time that he himself or the other thing exists.

This argument presumes that time, or any given stretch of time, is continuous (*synexis*)—a thesis Aristotle argues abundantly for elsewhere, including in the argument we have currently been discussing from *Physics*. It also presumes that perception always occurs for or during some stretch of time—a thesis consistent with Aristotle's view that perception (*aisthesis*) is, or consists of, a certain sort of change or process. Nevertheless, the gist of this first part to Aristotle's argument seems reasonably clear.

The second part to this argument is more convolute and obscure. Perhaps, its main steps may be articulated as follows:

(1) Suppose we can perceive for or during a time which itself is imperceptible.
(2) There could exist a time or a state of affairs which we could perceive or during which we could perceive for or during such a time only if either (a) we can perceive without perceiving for or during some stretch of time or perceive without perceiving some state of affairs, or else (b) we perceive time or a state of affairs by virtue of the nows associated with a given time or state of affairs.
(3) We do not perceive time or a state of affairs by virtue of the nows associated with a given time or state of affairs.
(4) We cannot perceive without perceiving for or during some stretch of time, nor can we perceive without perceiving some state of affairs.
(5) Therefore, there could not exist a time or a state of affairs which we could perceive or during which we could perceive for or during a time which itself is imperceptible.

(6) Therefore, there could not exist a time during which we could perceive for or during a time which itself is imperceptible.
(7) We can perceive for or during a time only if there exists a time for or during which we can perceive—whether or not this time is itself imperceptible.
(8) Therefore, we cannot perceive for or during a time which itself is imperceptible.

We shall see later that the now does play an integral role in Aristotle's understanding of perception and temporal cognition. Here, though, Aristotle is appealing to his by now familiar thesis that, whatever the now turns out to be, it is not a part of time—or, time is not constituted of nows. He is here insisting, in other words, that we cannot suppose this imperceptible time to be a now. Though nows (or, the now) play an integral role in perception and temporal cognition, for Aristotle a now is indeed imperceptible.

In *On Sense Experience and Sensible Objects*, Aristotle thus repeats his view in *Physics* that indivisibles (which would include nows, or the now) are imperceptible [*On Sense* 449a23]. But, the now is neither time, nor a part nor a constituent of time. Therefore, the imperceptible time postulated (and then refuted) here must instead be some stretch or magnitude of time which somehow is nevertheless imperceptible—for example, "by virtue of its minuteness."

In this regard, though, step (4) reminds us that perception is or consists in change(s) and process(es) of some sort. Option (a) in step (2) seems required as an alternative to option (b) because of the inconsistency established in the first part of the overall argument.

Aristotle seems to argue, in other words, that the notion of imperceptible time requires accepting the fact that perception both always occurs for or during some stretch of time (since we are always capable of recognizing the continuous passage of time and concordantly the likewise continuous temporal existence of ourselves and other things through and during perception); and yet it also requires denying this same fact (since the notion of imperceptible time effectively insists that we are not always nor continuously capable of this, inasmuch as we cannot recognize the passage or existence of something which we cannot perceive).

Notice, however, that Aristotle's statement of this argument associates, not only the continuousness of some perceived state of affairs (*pragma*), but also the continuousness of time or stretches of time (includ-

ing any purportedly imperceptible ones) with magnitude (*megethos*). The argument we have most recently been discussing from Aristotle's *Physics*, moreover, maintains that magnitude properly relates first to motion or change in one's surrounding external environment before it may then be associated also with time or stretches of time. This seems also to be Aristotle's view in *On Sense Experience and Sensible Objects*.

Indeed, when Aristotle argues against imperceptibles or imperceptible times in *On Sense Experience and Sensible Objects*, he more typically does so in regards to magnitudes and processes or states of affairs in our surrounding environment and our perceptions of them [e.g. *On Sense* 440a23, 445b10, and 446a15]. Accordingly, this argument's inclusion of our own perceptions and the temporal existence of our selves in arguing against imperceptible time(s), does not conflict with but ultimately supports his view in *Physics* that our capacity for recognizing not merely time's passing but its passing in determinate extents presupposes the natural environment in which we live, and our perception of and cognitive maturation within it.

It, moreover, is entirely reasonable to wonder whether we would in fact possess any sense of time, or of time's passage, were we psychically cut off entirely from our natural environment from birth, or whether we could retain such a sense were we henceforth cut off entirely from it for the remainder of our lives. It does not occur to Aristotle to consider such a scenario. But, Aristotle's general thesis that nothing exists in cognition which is not first encountered in our sensory perceptions would seem to imply that temporal cognition must begin in, or in some way presuppose, sense experience—where for Aristotle the primary or first objects of human sense experience are external (natural) existents.

And, indeed, Aristotle appeals to this thesis in *On Sense Experience and Sensible Objects* precisely in the context of one of his arguments against imperceptibles. Regarding the possibility that an object of sense experience may be constituted of features or parts which are not themselves perceptible, Aristotle tells us [*On Sense* 445b15–18] that an object of sense experience must be constituted (entirely) of items or parts which are themselves perceptible:

> for, it certainly cannot be constituted for example of mathematicals. Besides, how could we then discern them or come to know about them? By thought? But, they are not objects of thought [but objects of sense experience]; and nor does thought think about external objects otherwise than by following sense experience (*me met' aistheseos*).

Minimally, this surely applies in the case of our capacities to think about or cognize determinate extents of time—what earlier in *Physics* Aristotle identified with time "as we always encounter or come across it."

Aristotle, though, does not claim that time just by itself is an object of sense experience, despite his insistence that it is perceptible and indeed that there is no time which is not perceptible. But, then, in what manner or sense is time perceptible?

In *On the Soul* [II.418a7–25], Aristotle distinguishes three categories of perceptible objects—or, as commentators often term them, sensibles: special sensibles (*idia*), common sensibles (*koina*), and incidental sensibles (*symbebekoi*). Special sensibles are perceptible objects insofar as they are perceptible by one, and not more than one, of our five sense modalities. They are specific to a single sense modality, or sort of sensory organ. Whereas, common sensibles are perceptible by more than one of our fives sense modalities. Aristotelian incidental sensibles are more difficult to characterize.

Special and common sensibles have in common that they are integral to the manner in which sense experience involves a qualitative change in a sensory organ—or, as Aristotle expresses it, the manner in which a perceptible object affects (*paschei*) a sensory organ and "likens" the organ to it. Whereas, incidental sensibles are termed 'incidental' (to sense experience) because they differ from special and common sensibles in this regard.

Incidental sensibles are not less involved than special and common sensibles in the causal conditions and processes responsible for our sensory experiences, nor are they any less intentional objects of our perceptions of them; but they are incidental to the changes or affections as such which occur in our sensory organs—particularly insofar as these constitute "likenings" of our sensory organs to their intentional (sensible) objects.

A standard generic list of Aristotelian special sensibles includes colors and light-and-dark for vision; sounds, perhaps including pitch and tones, for hearing; textures (rough-and-smooth) and temperatures (hot-and-cold) for touch; odors for smell; and flavors, perhaps including for instance sharp-and-mild or bitter-and-sweet, for taste. Properly speaking, though, for example color is not as such a sensible. Instead, the pertinent sensible for Aristotle is a colored object—or an object insofar as it is colored or "has" color. This remark extends to all of Aristotle's sensibles. I am, however, following a commonplace, even if mis-

leading, practice in naming his sensibles in this more simplistic fashion.

Here, in *On the Soul*, Aristotle lists motion, rest, number, figure, and magnitude as kinds of common sensibles. Minimally, he maintains that we can both see and feel instances of these. In *On Sense Experience and Sensible Objects*, Aristotle posits as one list of kinds of common sensibles: figure, magnitude, motion, and number [*On Sense* 437a9]; but he also proffers as another list: magnitude, figure, roughness and smoothness (contrary to textures elsewhere seeming to be special sensibles), and sharpness and bluntness (which he considers related to shape, not texture) [*On Sense* 442b5].

It is unclear whether in any of these somewhat differing lists Aristotle takes himself to be articulating a complete or definitive list of common sensibles. Likewise, it is unclear whether the fact that only magnitude (extension) and figure (shape) show up in all of his lists is significant. What is significant, however, is that time does not show up in any of Aristotle's lists—even though motion and magnitude (the two sensibles to which Aristotle is currently relating time in *Physics*) are common items on his lists.

In *Categories*, Aristotle identifies ten sorts of things we can predicate (think, say, or attribute) in regards to natural existents; and *time* is one of the ten. Very few of the ten "categories" (or their members) would seem to qualify as sensible objects as such, though—at least not given Aristotle's accounts of sensible in *On the Soul* and *On Sense Experience and Sensible Objects*. And yet, all ten are meant to have their primary meaning and application in the context of perceptible things, in reference to perceptible things as their subjects (*hypokeimena*). It may be pertinent to this, however, that Aristotle's notion of incidental sensibles is very vague and may cover a lot of intentional and existential territory.

In *On the Soul*, Aristotle's stock example of an incidental sensible is *the son of Diaros* inasmuch as a perceived object's being the son of Diaros is "incidental" to the white (light skinned) thing, he maintains, we more properly and specifically see. White—or, more properly, *something white* or *a white thing*—is a special sensible. There is no reason, though, why Aristotle could not just as well have associated the son of Diaros with a sensible object having a certain figure or shape, or emitting a certain sound or odor. Many, maybe all, of the categories (or categorial members) which do not qualify as Aristotelian special or common sensibles, then, might fall within the wider purview of incidental sensibles.

In any case, time is most assuredly not an Aristotelian special sensible, nor even a common sensible—though, we have already seen, Aristotle considers it especially closely associated with certain common sensibles (in particular, motion and magnitude). Significantly, this would imply for Aristotle that our awareness and cognition of time (or of a sensible object's temporality) is always capable of error. Aristotle, that is, maintains that our sensory faculties are incapable of error in regards to their respective special sensibles [*On the Soul* II.418a13]; and he is normally understood to hold that incidental sensibles differ from special sensibles in this regard. Indeed, this may be another sense in which he characterizes them as incidental (*symbebekos*).

And yet, the case can also be made that, although Aristotle never includes time among his special nor his common sensibles, it nevertheless is more akin to them than to his incidental sensibles. For instance, Aristotle's approach in *On Sense Experience and Sensible Objects* to explicating how or why every magnitude (*megethos*), and in general every definite extension (*peperasmenon*), is perceptible seems directly pertinent to his insistence there that every time is perceptible as well.

Aristotle wonders why, for example, "the ten-thousandth part of a visible grain of millet goes unnoticed"; and he explains that "likewise with exceedingly minute quantities in cases of other perceptible objects: they are potentially (*dynamei*) visible [perceptible] but they are not actually (*energeiai*) so—at least not as they would be in separation" from the larger whole (*On Sense* 446a1–6). This qualifying clause ("at least not as they would be in separation"), though, is very odd.

Does Aristotle truly intend that such "exceedingly minute" quantities as a ten-thousandth part of a grain of millet in fact are visible (perceptible), though only "in separation," even while they indeed are not (actually) visible insofar as they comprise such a minute quantity of a larger whole (which is visible)? Aristotle just sidesteps this question, however, averring that in fact such quantities never exist by themselves but always only within a larger whole, whereupon he reasserts regarding any such quantity: "Yet, it is entirely perceptible nonetheless. For, it both already is potentially so and it also is actually [perceptible] *as a constituent*" of some larger whole [*On Sense* 446a14–16]. But, even so, in what sense is it "entirely perceptible" under this condition?

Aristotle might be claiming here that such notions as *the ten-thousandth part of a grain of millet* are entirely abstractions. Perhaps he does not concern himself with what to say about this quantity were it to exist actually separate from any grain of millet because it cannot do so. In

more Aristotelianesque terms, this notion can never denote a real particular (that is, a substance). It can denote only a certain hypothetical ("potential") portion (or, constituent) of a larger whole (here, a grain of millet). His reference here (on my translation) to this quantity's "already being potentially so," then, might not refer to a potentiality on its part for separate existence but to its existential character and status as a consequent of our performing a certain abstract mathematic operation on the millet grain—that is, were we (conceptually, abstractly) to one-ten-thousandth, as it were, a grain of millet.

Aristotle's argument here regarding the perceptibility of exceedingly minute quantities, accordingly, seems to presuppose his rejection of scientific atomism (that is, the notion of vanishingly tiny real particulars) and to invoke some such principle as: To perceive a certain whole is to perceive every potential portion of that whole. In regards to time, we in fact saw in Chapter 5 something like this principle implicit in some of Aristotle's criticisms, for instance, of equating time with the Heavenly motions.

It also buttresses the important point that Aristotle (like Plato before him) does not think of time as somehow built up from exceedingly tiny (short, brief) time-units but rather as actually existing (or passing) only in humanly determinable amounts (for example, the time from sunrise to sunrise)—*albeit* amounts which, of course, are then susceptible to certain mathematic operations (for example, fractioning).

Aristotle insists, moreover, that we distinguish between perceiving something and being cognizant of perceiving something. He thus cautions, regarding a putatively imperceptible magnitude or quantity, that we may in fact be able to perceive it and yet it may seem imperceptible to us because, owing to its minuteness or its distance from us, "its size is not apparent to us" [*On Sense* 448b15]. Aristotle asserts this, moreover, quite explicitly while arguing against the notion of imperceptible time. Perhaps, then, putatively imperceptible time is rather time which is too short (passes too quickly) for its actual "size" to be apparent to someone even while she does in fact perceive it—especially insofar as it in turn is also part of a larger (longer) time whose actual perceptibility is more evident to her.

In any case, Aristotle's approach to putatively imperceptible time(s) thus treats time as akin to magnitude, one of his common sensibles. Aristotle's discussion in *On Sense Experience and Sensible Objects* of transparency and color [*On Sense* 439a24–439b28] is even more tantalizing in the comparison it invites to time—to how it might be possible, to what

it might mean, for us to perceive time on Aristotle's account. In particular, perhaps (perceptible) time generally relates to motion, and a determinate (perceived) time relates to a particular magnitude of motion, in a manner somewhat comparable to transparency's relation to color (or *vice versa*).

Transparency (*diaphanes*), for Aristotle, is whatever about such things as air or water or glass allows us to see other things through them or within them. Aristotle characterizes transparency as a certain natural condition and potency (*tis physis kai dynamis*) common to all such things, and one which "does not exist in separation from but belongs to those [transparent] things, and is inherent (*enuparchei*) also in other corporeal things to greater and lesser degrees." He then characterizes color, in this context, as the terminus (*peras*—earlier he also said 'extremity', *eschaton*) of the transparency inherent in a determinately circumscribed or delimitated body (*en somati horismenoi*).

Color is thus not the terminus or boundary of a corporeal body as such. (This would be its shape.) Rather, Aristotle maintains, a corporeal body or medium possesses a certain same natural condition (*physis*) inwardly—in virtue of its inherent transparency—as that which manifests itself outwardly as color: Hence, "transparency, insofar as it inheres in corporeal bodies—and it inheres in them all to greater and lesser degrees—imbues them with a like share in color" [*On Sense* 439b9 f.]. Indeed, the sort of color a corporeal body "manifests outwardly" is systematically related to the degree of transparency inherent "inwardly" throughout it.

Aristotle's idea here might make more sense to the modern reader if we keep in mind that the classical Greek color spectrum ran from (chromatically speaking) white to black, or (corporeally speaking) light to dark. Yellows, greens, reds, browns, blues: all other colors were thought to be sensible consequents of certain mixtures or degrees of—or, to lie on a continuum between—pure whiteness and pure blackness, or utter lightness and utter darkness.

In any case, Aristotle posits that we perceive transparency by means of, or in the form of, its "outward manifestation," color. In *On the Soul*, Aristotle does attribute a natural color of sorts to transparency—though he equates this "color of transparency" just with light (*phos*) as such, explaining that "light is a sort of color of the transparent" [*On Soul* II.418b12]. In *On Sense Experience and Sensible Objects*, Aristotle echoes this view, which he relates to the fact that corporeal bodies which seem to lack determinate boundaries or surfaces (for example, whispy clouds or,

today, polluted air) may nevertheless possess a color-like sheen or tint (*chromatizomena*) [*On Sense* 439a20–439b5 *passim*]. Although transparency is not *as such* perceptible, accordingly, we sometimes can obliquely perceive it nevertheless—for example, by virtue of the translucent sparkle of a rainfall, the diffuse whiteness of diaphanous clouds, or the yellow-brownishness of a polluted sky.

Returning to *Physics*, Aristotle begins examining how relating time to motion, and motion to magnitude, pertains to our perception and cognition of time by focusing on the spatial relationship of before and after (*proteron kai hysteron*)—as, for example, when we discern one thing's being situated in front of or forward another and (or) the latter's being situated in back of or behind the former. He argues [IV.219a14–25]:

> Before-and-after first pertains to space. In particular, it pertains to relative spatial positioning. Since before-and-after is thus related to magnitude as well, before-and-after must also pertain to motion—as the latter corresponds to (*analogon*) the former. But [since it pertains to motion], before-and-after must consequently pertain also to time—to which it pertains with respect to the sequential ordering of things as they are always different-and-again-different…

Accordingly, we cognitively discern (*gnorizomen*) time just insofar as we have delineated motion, having delineated it by virtue of before-and-after; and we recognize that time has passed just insofar as we have perceived (*aisthesin*) before-and-after as it pertains to a motion.

Aristotle's previous argument related motion to magnitude by observing that every motion is from something to something (*ek tinos eis ti*)—or, in the particular case of locomotion, from someplace to someplace. This from-which and to-which of a motion (or any sort of change) may also be designated as the termini or extremities of the motion's magnitude—or, in the case of locomotion, its distance. It is tempting to suppose that this current argument, accordingly, intends to relate before-and-after to this from-which and to-which of motion.

On the other hand, how the from-which and to-which of a motion may relate to before-and-after with respect to space (or place) is unclear. It seems dubious to suppose that the start- and end- termini locations of every locomotion, for instance, are always "behind" and "forward" one another in any coherent and cogent spatial respect; and this supposition seems just out of place in the case of other sorts of motions (non-spatial-location sorts of changes).

Perhaps, though, Aristotle is (unwittingly) seducing us to search for a closer, more direct relationship between the temporal before-and-after

and the spatial before-and-after than he actually intends. Motion (most likely) and magnitude (definitively) are Aristotelian common sensibles. Time, however it might fit into Aristotle's assay of sorts of sensibles, seems surely not to be as such a common sensible (nor, more obviously, a special sensible). In some respect(s) or other, then, it must be akin to incidental sensibles even if it also is linked closely to certain common sensibles in regards to its perceptibility.

And, indeed, Aristotle does not in the above relate time to mere magnitude, nor just to magnitude of a certain sort or amount. He relates time to the, arguably, conceptually more complex notion (seemingly discredited earlier in *Physics*) of a sequential ordering of different-and-again-different things (*to akolouthein aei thateroi thateron auton*); and this notion may be meant to pertain in turn to time's linkage with motion, or a given magnitude or extent of motion.

It is hugely mistaken, in Aristotle's view, to sharply distinguish sensory experience (even construed, as Aristotle does in *On the Soul*, as a certain sort of alteration in a sentient being's sensory organ) from all cognitional mental processes. Still, Aristotelian incidental sensibles do seem to imply a degree of cognitive functioning distinctly greater (or, perhaps, more sophisticated) than seems required for us to perceive special and even common sensibles.

Pertinent to this, Aristotle's recent remarks from his discussion in *Physics* stated, more precisely, that we cognitively discern time insofar as we *have delineated* motion; and we recognize time's passing insofar as we *have perceived* before-and-after with respect to motion. Upon echoing his insistence in *On Sense Experience and Sensibles* that time is always and entirely perceptible, accordingly, Aristotle argues in *On Memory and Recollection* [449b31–33]:

> Every memory is dependent upon (*meta*) time. Accordingly, those which perceive time are the only animals capable of remembering; and this [i.e. memory] is what enables us to perceive time.

While memory presupposes and depends on time, Aristotle maintains, perceiving time presupposes and requires memory (and its operation). In a real sense, it seems, we can be [fully?] cognizant of time's passing as such in effect only after the fact. In virtue of the different-and-again-different character of temporal existence, it is already gone even as we perceive it.

Insofar as time's (actual) perceptibility depends upon an interaction of some sort between our sensory faculties and our memorial capa-

bilities, moreover, it may indeed seem entirely reasonable to suppose (as Aristotle insists) that, insofar as time has passed, surely a certain amount or stretch of time has passed—at least insofar as we may be cognizant of it. In this context, too, perhaps the before-and-after as it pertains to time's continuous passing and Aristotle's prior association of before-and-after with the termini of determinate magnitudes (and therefrom to the termini of determinate extents of time) may now be seen to be conceptually commensurable.

Indeed, Aristotle continues his current discussion in *Physics* in effect by glossing the cognitional structure of time perception [IV.219a25–29]:

> We delineate motion by virtue of those [before and after] by postulating (*hypolabein*) one then the other, and so also a certain "difference" existing between them. For, when we conceptualize (*noesomen*) them as differents—as extremities (*ta akra*) for what exists between them—and the soul has in like manner postulated two nows, one designating the before-extemity and the other designating the after-extremity, only then do we recognize that time exists. For, what is delineated by reference to the now seems to us to be time; and so we may presume that this is what it is.

Notice, though, that this gloss does not require the two nows to correspond to the onset (start-terminus) and the culmination (end-terminus) of an entire (completed) motion. Any such pair of nows will terminate some determinate extent—namely, whatever "difference" thereupon exists between them—inasmuch as it is axiomatic for Aristotle that between any two locations on a continuous magnitude there shall always exist some magnitude or extent terminated by those two locations.

Accordingly, even if we do not consciously set out to delineate how much time passes (much less how much time a particular complete motion takes from its onset to its culmination), insofar as we cognitively discern or recognize its passing at all (concordantly with perceiving the motion itself) the implicit cognitive process by which we do so is effectively the same.

We have seen that one of Aristotle's reasons for denying that the now is a part of time posits that there is no such thing as an imperceptible time; whereas the now is (an) imperceptible (that is, it is not a perceptible, or something which is perceptible). Any given time (that is, any time which is some determinate amount of time), however, must be perceptible; and every part of a perceptible whole is therein also perceptible. Aristotle's current discussion thus intimates another reason why the now cannot be a part of time.

I have intimated (in Chapter 4) that the *now* sometimes functions for Aristotle as a sort of primary temporal designator, perhaps comparable to the *here*'s role in spatial cognition or to the *this*'s role in objectival cognition generally. Aristotle's current discussion seems to be one of those times. In particular, Aristotle avers, by implicitly positing a *NOW!* and then subsequently positing another *NOW!*, we (or, more precisely, our cognitive processes) thereby implicitly designate the extremities of a certain temporal magnitude—akin, perhaps, to how postulating a *HERE!* and then postulating another *HERE!* may be thought to designate the extremities of a certain spatial magnitude, or distance.

This temporal-designator *NOW* need not be what Aristotle one place refers to as 'the present now' (*to parantos nun*) [IV.222b7]. Still today, for example, we may think about the time existing or passing while the heroes of Sardinia slumbered. Reflecting upon Aristotle's example, one might "postulate," in effect: "So, they fell asleep *NOW!* They awoke *NOW!* And, in the meantime, a certain amount of time passed." Arguably, though, a person may be said actually to *perceive* time—or, the temporality of some existent or phenomenon—only when the cognitional structure of temporal awareness glossed by Aristotle operates in consort with perception.

It may be helpful to think of memory's role in Aristotle's account of occurrent temporal cognition in terms of the contemporary notion of short-term memory—that is, memory as it continually interacts or interfaces with experience, prior to whatever additional processes are needed to "fix" our experiences if they are to be retained long-term. In these terms, only upon sensory awareness passing its contents on to short-term memory—or, perhaps, only as it does so—might our cognitive processes postulate a *NOW!* to serve as the start-terminus to (some extent of) time's passing. How much time is thereupon perceived to pass, of course, would then depend upon our cognitive processes in a similar fashion postulating another (and so, in that regard, a different) *NOW!*

Arguably, though, memory must be involved in some such manner whenever we perceive, or cognitively delineate, a magnitude or extent of any sort—for example, spatial as much as temporal. The sort of cognitional structure Aristotle glosses for temporal awareness does not seem unique to temporality, or temporal cognition. Indeed, inasmuch as the natural universe is also the spatial universe, perhaps human perceptual cognition does not "mark off" or designate magnitudes or locations, as it were, just by *NOW*-ing or by *HERE*-ing as intentional

content passes from occurrent perception to short-term memory, but rather by *HERE-NOW*-ing—maybe even *THIS-HERE-NOW*-ing—in order to circumscribe our ongoingly perceived environment in ways pertinent to several different sorts of cognitional processing regarding it.

If, however, the *NOW* is just one facet of some such multifunctional "what is occurrently perceived" demarcator, in what way is it distinct or distinguishable from this designator's other facets? Arguably, we cannot say merely that *NOW* is that facet of it in virtue of which this perceived-object-designator delineates time. For, if the *NOW* is in fact equally the *HERE* (or, rather, if there is no *NOW* apart from the *HERE-NOW*, or maybe even apart from the *THIS-HERE-NOW*), then one and the same designator will also delineate space (or, spatial extents)—indeed, maybe even also just existents or phenomena ("this-es") as such.

It is at this point of his discussion that Aristotle asserts what many commentators and scholars have taken to be his most definitive statement on the nature of time, in now arguing [IV.219a30–219b3]:

> Insofar as we perceive the now as a one and not by virtue of before and after as it pertains to motion, nor as itself just a certain sort of before and after, it seem to us (*dokei*) that no time whatsoever has passed—and likewise no motion. Whereas, insofar as [we do perceive] the before and after [as it pertains here], we do say that time [has passed]. For, this is what time is: Number (*arithmos*) pertaining to motion in accordance with (*kata*) before and after. Hence, time is not motion but rather it pertains to motion insofar as motion admits (*exei*) number in this respect.

Here, Aristotle seems to reintroduce another previously criticized, and purportedly discredited, notion (discussed in Chapter 4): The now as always remaining one and the same. He seems to consider at least the possibility that indeed we can perceive the now—or, what it in a way designates—as one and the same. Perhaps, though, Aristotle is rather appealing to the universal ubiquity of time to claim just that any continuous stretch of time must in that respect be a continuously same stretch of time.

In any case, the highlight of this argument, of course, is its assertion: *Time is number pertaining to motion in accordance with before and after*. Despite this assertion's prominence in historical as well as contemporary discussions of Aristotle's account of time, however, one wonders what it even adds to his discussion here.

Aristotle's principal example of the sort of "number" he asserts time to be is determinately extended continuous magnitudes. Time is num-

ber, Aristotle instructs, in a similar sense to how "the extremities of a line constitute number—and therein not in the sense in which the line's parts" would constitute number [IV.220a16f.]. Accordingly, he also notes that time is thus "a measure (*metron*) of moving and being moved—measuring the motion by delineating a certain motion which will measure out the entire motion" [IV.220b32–221a2].

In a difficult passage (even for Aristotle), Aristotle indicates that insofar as we wish to think of time as "number" in discreet rather than continuous mathematic terms, it is more comparable to how number may tell us, for example, how many horses there are *in toto* than to how number can, beginning with one horse, total up how many horses there are [IV.220b20–22]. What Aristotle seems to have in mind here is akin to how 'a ream of paper' quantifies a certain mass of paper(s), in contrast to how 'five hundred sheets' quantifies the same mass; and he is claiming that time as number is more akin to the former sort of (discrete) quantity than to the latter sort.

In any case, Aristotle's associating time with number seems mainly to emphasize yet further earlier claims to the effect that time "as we always encounter or come across [perceive] it" is always determinately extended. Perhaps, though, what associating time with number adds to Aristotle's account is discernible when he next argues, in support of this association [IV.219b4–5]:

> On the one hand, we judge (*krinomen*) the more and less by virtue of number and, on the other hand, we judge more or less motion by virtue of time. Consequently, time is a certain sort of number.

Aristotle does not explain what precisely he means here by 'more or less motion'. It seems plausible, though, to suppose that he has in mind, minimally, comparative assessments requiring "numberings" for expressing ratios and proportions.

Though continuous, time passes in determinable amounts, and so in that respect at least may be (comparatively) quantified; and, we consequently presume, one motion may then take (comparatively) more or less time than another, or last for a (comparatively) longer or shorter time than another. Perhaps it is in this sense, then, that Aristotle avers that motions also may be discernibly "more or less … by virtue of time."

Examples of what Aristotle means here by 'more or less motion' might then include such cogitations or "judgments" as: If Bob took twice as long as Achilles to run the same race (according to some esti-

mation procedure), then Bob ran half as fast as Achilles (and Achilles ran twice as fast as Bob). Or, if Joe drove to El Paso in one day and to San Antonio in two days (in some sort of more-or-less constant, single speed conveyance), then Joe drove twice as much to reach San Antonio than he did to reach El Paso. Or, since Sol rises twenty-eight times between New Moons and three-hundred and sixty-four times between Autumnal Solstices, Sol completes thirteen times as many Earth-orbits between Autumnal Solstices than during a Lunar Month.

It seems important to Aristotle, however, that we do not understand the relationship he asserts between time and number to imply that time is as such a mathematical entity, or as such a certain sort of number or mode of quantification. Indeed, he immediately adds regarding his assertion of a relationship between time and number: "Inasmuch as number exists in two ways—that is, we call both enumerating and what is enumerated number—surely time is what is enumerated" when we judge (temporally discern) more or less motion [IV.219b6–8].

But, insofar as time is therefore to be thought of as something which is enumerated (rather than something which enumerates), the fundamental question remains: So, what is this "something" which is enumerated, which we take to be time when we "number" it—for example, in order to judge "more or less motion"?

Accordingly, while Aristotle's famous formula relating time to number asserts something significant about time—or, at least, about its utility, or functionality, especially in regards to certain cognitive processes or aims—it in fact does not seem to tell us what time as such is.

CHAPTER SEVEN

REAL TEMPORALITY IN AN ARISTOTELIAN WORLD

Aristotle conceives the natural universe to be populated with such existents as trees and mountains, horses and condors, oceans and the Heavenly bodies—what are termed *primary substances*. These existents move and change. Except for the Heavens and Heavenly bodies, they are also generated and they "corrupt." The natural universe, accordingly, is the universe of motion and change ("becoming"), and generation and corruption.

Primary substances are also the primary objects—or, rather, the real subjects (*hypokeimena*)—of sense experience and its "sensibles" (as discussed in Chapter 6). Hence, natural existents are colored, have shape and size, can be seen, heard, smelled, or the like. They, of course, also interact and relate to one another in various perceptible ways—especially in ways canvassed by the pertinent categories of concepts, predicates, or modes of "being" Aristotle articulates in *Categories*. Consequently, the natural universe is the sensible universe as well.

Similarly, Aristotle does not hold that there is the natural universe and a temporal universe. Rather, the natural universe is the temporal universe. Natural existents just are temporal existents.

Aristotle's denial that time is not to be just equated with the natural universe as such (as an incredibly huge sphere, for example, or just its cosmic or other motions) does not imply that time is therefore something distinct from the natural universe. How to articulate time's relationship to the natural universe, though, is perhaps uniquely problematic.

Time, indeed, should not be just equated with natural existence; and yet, Aristotle has stated, it somehow entirely pertains to, "embraces," exists "in consort with" all (and only) natural existents.

Later in Book IV of *Physics* Aristotle considers what it means to say that something "exists in time" (*to en chronoi einai*); and he avers that, at least sometimes, this means that "when it exists, time likewise exists" (*to einai tote ho chronos estin*) [IV.221a10]. Aristotle, however, cautions us [IV.221a19–26]:

> Clearly though, too, for something to exist in time is not just a matter of time existing when it exists—anymore than being in motion or existing in a place is a matter just of motion existing and the space existing [when it exists]. For, if to exist in something is just this, then every state of affairs (*pragmata*) will exist in everything whatsoever; and the heavens will exist in a millet grain. For, when the grain of millet exists, the heavens also exist. But, this is mere coincidence (*symbebeken*); whereas the previous relationships follow by necessity—so that when a real thing (*ontos*) exists in time there exists a certain time when that thing exists, and when a real thing is in motion there exists a certain motion which that thing is in.

In sum, natural existence, spatial existence, temporal existence, and "becoming" (as well as sensible existence, too) are related to one another in a manner more indissoluble and necessary than any relationships obtaining among the actual denizens and constituents of nature themselves.

Aristotle has been emphasizing most recently in his discussion time's relation to (natural) motion—for example, arguing for the derivative character of its continuousness and of its before-and-after from motion's and spatiality's, or magnitude's. Time's and motion's inextricable relationship prompts Aristotle also to clarify his associating time with number [IV.220b15–19]:

> Not only do we measure (*metroumen*) motion by virtue of time but we also measure time by virtue of motion, inasmuch as they delineate one another. On the one hand, time delineates motion inasmuch as it is its number. Yet, on the other hand, motion delineates time. For, we say that time is much or little by virtue of a motion measuring it, just as in general number depends upon what is numbered—for example, number pertains to horses by virtue of there being one horse.

Aristotle seems in part concerned here to correct any misunderstanding to the effect that time's relation to motion is something of a one-way street—that time unreciprocally depends upon, is derivative from, motion (and related extensions or magnitudes). In so doing, however, he in a way deepens the mystery of how precisely time and motion do relate to one another. For example, does (one) *year* denote the time it takes Earth to orbit Sol (in modern cosmology); or, does each completed Earth orbit of Sol delineate (one) year?

Jean Piaget (as discussed in Chapter 3.2) provides an example of young children who recognize that two objects begin moving simultaneously and cease moving simultaneously and yet believe that the object which traversed a longer distance must have taken longer to traverse that distance than the one which traversed a shorter distance. Similarly,

an automobile trip of three hundred miles may seem to last far longer than would be in proportion to a one hundred mile trip, even driving at the same rate of travel (speed). Whereas, traveling eighty miles at a vehicular rate of eighty miles-per-hour may seem to go more quickly than traveling thirty miles at thirty miles-per-hour.

Sometimes many things happening during a certain period of time makes time seem to pass more quickly, to constitute a shorter period of time than it actually is (or was). Other times, the contrary may in fact happen regarding a person's particular experience of time. Disentangling time from motion itself, or from certain features of motion(s), is indeed a significant cognitive achievement; and, even then, it is hardly infallible, unambiguous, nor incapable of reentanglements.

But, insofar as disentangling time from natural existence and motion as such requires certain cognitive capabilities and processes, one might wonder whether time itself does not in fact existentially depend on those cognitive capabilities and processes. At least in the case of his time-as-number association, Aristotle himself seems inclined this direction.

When we perceive Achilles running a race and discern his completing it more quickly than his opponent, when we perceive a leaf changing color and discern its doing so more slowly than the color-changing chameleon next to it, when we perceive today's commute and discern its taking longer than it did yesterday, we are surely discerning some sort of real difference between Achilles and his opponent, the leaf and the chameleon, and today's and yesterday's commutes. Arguably, though, insofar as we also make judgments assigning numbers to the motions and compare them in numeric (or, at least, general proportional) terms, we are indeed *assigning* numbers to them. At the very least, we are perceiving and discerning them in a certain cognitive manner, or by utilizing certain cognitive resources and techniques.

Arguably as well, as suggested in Chapter 1 of this investigation, apart from those cognitive resources and techniques and the creatures utilizing them (for example, us), there are just the natural existents, their respective motions, and their relations to one another in the context of the ongoing progress of natural existence. Indeed, Aristotle thus argues concerning time as number [IV.223a21–29]:

> Whether if soul did not in fact exist time would exist or not is a legitimate question to consider. For, if [were soul in fact not to exist] it is then impossible for there to exist in reality something which numerates, and

> so also impossible for any sort of numeration to exist, then clearly neither could number exist—inasmuch as number is either what has been or what is numerated. Consequently, if nothing else but the soul—or more precisely soul's intelligence (*nous*)—is capable of numerating, then it is impossible for time [insofar as it is number] to exist if soul did not in fact exist.
>
> Nevertheless, though, that reality to which time pertains may still exist—for example, insofar as we may presume that motion does indeed exist apart from the soul since before and after would then still exist as it pertains to motion, and time [as number] pertains to these by virtue of their being numerable.

In sum, then, insofar as time depends on creatures endowed with intelligence, and so capable of certain cognitive processes and judgments, time indeed would not exist if those creatures had not existed.

Aristotle's concern here is not whether time exists internally or externally (*endo* or *exo*) to the soul but whether its existence is "apart from" (*aneu*) or dependent on the soul. In this regard, moreover, Aristotle has suggested at most that time's nature and reality may be a complex matter wherein it partly, or in certain respects, depends on certain cognitive capabilities and processes on the part of temporally aware beings—and this includes especially its mathematization, or certain of its distinctly mathematic or numeric features.

It may be noteworthy, too, that Aristotle's discussion here concerning time-as-number's dependence on soul is formally hypothetical. It states what would follow if nothing other than the soul (or, more precisely, other than an intelligent soul) were capable of numerating. Nevertheless, Aristotle is typically presumed to endorse this argument's conclusion; and this presumption seems appropriate and correct in virtue of its context and the flow of Aristotle's discussion. What tends to be overlooked, however, is the highly specific, clearly limited subject matter of this discussion.

One way Aristotle approaches questions of real existence is by considering whether something could be generated or can perish. For instance, insofar as something is demonstrated to be imperishable, it must exist. And, demonstrating that something has been generated is one way to establish its existence.

In *Metaphysics*, Aristotle even argues that if something is neither generated nor perishable then it cannot be a real substance (*ousia*); and he uses this principle to deny that the now could be a substantive, real existent [*Metaph.* III.1002a30–32 & 1002b5–8]:

> For, a substance which previously did not exist but now does or which previously existed but now does not is thought therein to undergo a process of coming-to-be or of perishing … Likewise [for example, as with a geometric point], regarding the now as it pertains to time: since it cannot come-to-be nor perish—though it seems always different—it follows that it cannot be any sort of substance (*ouk ousia tis ousa*).

On the other hand, Aristotle's investigation of time in *Physics* accords time a causal role with respect to generation and perishing. For example, he notes [IV.221a30–221b2] that

> any thing will be affected (*paschei*) by time—as we customarily express by saying for instance that time wastes things away and that all things age because of time and that forgetfulness ensues on account of time … For, time is by its own nature a cause (*aitios*) of perishing [decay, destruction, ruin (*phthoros*)].

Time, then, is related to real existence at least in that it plays an explanatory or causative role in the passing away or perishing (perhaps, also in the coming to be or generation) of natural existents; and it does so by its very nature (*kath'heauton*). But, while this provides additional reason to think that time, insofar as it may be said to exist, does not entirely depend upon or derive just from certain intellectually capable souls, it does not clarify how it is that time does pertain to real existence so that it may legitimately be thought to play a causative role in its "becoming."

When introducing his formula associating time with number, Aristotle had asserted that "insofar as we perceive the now as a one … it seems (*dokei*) to us that no time whatsoever has passed"; whereas, "insofar as we do perceive the before and after … we do say that time has passed" [IV.219a30 ff.].

Initially, this may seem merely to relate back to Aristotle's earlier thought experiment regarding the heroes of Sardinia; and, surely, to some degree it does harken back to it. Upon stating his justification for relating time to number (namely, because we judge more and less movement by virtue of time), however, Aristotle associates this perceived "oneness" of the now also with temporal concurrence (simultaneity): "Insofar as movement is always another-and-then-another, so too is time. Yet, every simultaneous time is therein the same time" [IV.219b9 f.].

Aristotle had earlier characterized temporal concurrence as "existing in relation to one and the same now" [218a25 f.]. Here, then, Aristotle may be echoing that notion to claim in effect that, insofar as time is

or remains the same, simultaneity likewise exists or continues (and *vice versa*).

But, however we are to understand the precise meaning of this cryptic remark regarding "oneness," the salient point is that Aristotle now posits both of these notions: first, that time as it relates to the continuousness and before-and-after of movement is always different; whereas, secondly, time as it relates to simultaneity (or *vice versa*) is always one and the same. Neither notion stands on its own, however, to be understood somehow apart from the other.

Indeed, the continuousness and before-and-after of a given motion surely does not preclude other motions simultaneously existing or synchronically occurring. And, conversely, if every time (instead of only every simultaneous time) were in fact just one and the same time (or, were all simultaneous things or motions therein related just to one and the same time), then everything in the natural universe would exist simultaneously with everything else. As Aristotle's earlier argument stated, "things which occurred ten thousand years ago would be (temporally) concurrent with what has occurred today and nothing would occur before or after anything else" [IV.218a28f.].

Aristotle, accordingly, has brought his discussion full circle back to those earlier arguments (discussed in Chapter 4) seeking to demonstrate the absurdity, and so the impossibility, of the now. He does not directly and explicitly respond to those arguments, however, to justify his invocation, in articulating his own account of time, of the now.

Aristotle seems, rather, at least partly just to reject the initial supposition behind those arguments, that the now must be either the one (always different) or the other (forever the same). That is, he grabs this prefatory dilemma by the horns and maintains rather that in fact the now is both. He argues [IV.219b12–30]:

> The now is in one respect the same while in another respect it is not the same. For, insofar as it designates what is another-and-then-another, it is different … Whereas, insofar as it designates what in reality exists at a given time, it is the same …
>
> Again, what endures [a motion] is like the point in that we cognitively discern a motion and its before and after by reference to it. This is what stays the same when the now designates what at a given time in reality exists—whether this be a point or a stone or something else—even when it is otherwise [than the same] in regards to its description, as when the Sophists suppose that Koriscon-in-the-gymnasium is different from Koriscon-in-the-market-place.

> In this sense, what endures [Koriscon] is different because of its being one place and then another place. Likewise, the now corresponds to (*akolouthei*) what endures, while time corresponds to its motion: For, it is by reference to what endures that we cognitively discern before and after regarding its motion—so that the now exists while what is being numerated [by reference to what endures] is before and after [regarding its motion].
>
> And so, insofar as the now designates what in reality exists at a given time [what endures], it also remains the same in relation to the before and after—for, the now then relates to what exists both before and again after regarding a motion—and yet it *is* different, too—for, it is by virtue of what is being numerated [by reference to what endures] being before and after that the now pertains to motion …
>
> Thus it is that in one respect the now is always the same while in another respect it is always different, inasmuch as this is already the case concerning what endures.

Aristotle's positive account of the nature and reality of time has thus far focused on the now as designating temporal befores and afters conceived to demarcate stretches of time.

Aristotle, in particular, began with the thought experiment wherein the heroes of Sardinia "conjoin the before-now (*to proteron nun*) and the after-now (*to hysteron nun*) and make them one (*hen*)," and consequently do not recognize that time passed while they slept. He then introduced the notion that time is continuously extended in concordance with (*dia*) a motion's continuous magnitude "from something to something," and explained that we cognitively discern time (or its passing) insofar as we delineate the motion in regards to before-and-after as it seemingly comprises a "sequential ordering of things as they are always different-and-again-different."

More precisely, Aristotle explained further, the soul therein recognizes what it cognitively discerns to be time insofar as, with respect to this seeming sequential ordering, it has "postulated two nows, one designating the before-extremity and the other designating the after-extremity." This account of temporal cognition comports well with his thought experiment. It explains what the heroes did not do, so that they did not recognize that time passed while they slept.

On what basis, though, does Aristotle posit that the soul therein recognizes what it has demarcated to be a stretch of time? Or, on what basis does Aristotle posit that the soul recognizes the demarcation designator it therein employs as appropriately a (the) temporal designator (the now)?

Initially, Aristotle's investigation may now seem to be moving in a different direction. In explicating how the now may be conceived to be both one and the same while also different and again different, he has associated the now with what endures a motion (for example, Koriscon, a chameleon, or Sol) while associating time with its motion (for example, Koriscon's stroll from the gymnasium to the market-place, the chameleon's changing from brown to green, or Sol's heavenly circuit). Moreover, Aristotle continues [IV.219b33–220a9]:

> It is thus apparent that if time did not exist then neither would the now—or rather, conversely, if the now did not exist then neither would time—since, just as what endures and its local motion concurrently exist, so too would the number pertaining to what endures and the number pertaining to its local motion; for, time is associated with the number of a local motion whereas the now is associated with what endures it, which is analogous to the unit (*monas*) of number.
>
> Moreover, time is both continuous by reference to the now and yet also divided in accordance with (*kata*) the now. For, here too there is a correspondence to local motion and what endures the motion inasmuch as a motion or local motion is one by reference to what endures, since this is one … and it is by reference to this one that the motion delineates its before and after.

Aristotle here again associates time with the continuously sequential another-and-then-another motion, and the now with what endures or persists during the motion. But he also, surprisingly, seems to make time's existence dependent on the now and its existence—surprising since the now is not a part nor a constituent of time and, indeed, its relationship to time is "accidental" (*symbebeken*) [IV.220a22].

Perhaps, though, what Aristotle intends by stating that "if the now did not exist then neither would time" is that time's existence is dependent on what the now designates, which in the previous passage Aristotle also characterized as what in reality exists at a given time. If Koriscon did not exist, then neither could Koriscon's stroll to midtown Athens and, consequently, nor could time—or, at least, not the time pertaining to and delineated by Koriscon's stroll.

But, surely the time at which Koriscon exists and the time which passes while he strolls from the gymnasium to the market-place would still exist if he did not. That is, surely the time which exists and passes when he does in fact exist (and takes his stroll) would still exist.

When Aristotle states that the now designates what in reality exists at a given time, however, *at a given time* does not refer to some indivisible

slice of time, nor some indivisible location on a time-dimension of sorts. Rather, *at a given time* seems mainly for Aristotle to connote two things: First, it connotes that the nature of temporal existence is such that various distinct and diverse things exist simultaneously. For instance, Koriscon's being a temporal existent implies that, if he exists, various other things may also exist "at the same time" that he exists. Second, it connotes that the nature of temporal existence is also such that distinct and diverse things which do not exist simultaneously nevertheless bear determinate temporal relationships to one another. The most obvious temporal relationships here are the before and after relationship, and the determinate extent-in-between relationship. For example, Koriscon existed before Galen and after Solon; and in fact he existed such-and-such much time before Galen and so-and-so much time after Solon.

If Koriscon did not exist, then nothing could exist simultaneously with his existing; and nor could anything temporally relate to him before or after, nor by any amount of intervening time. In this sense, then, the time at which Koriscon exists would not exist if Koriscon did not exist. Nevertheless, Koriscon in fact did exist; and so various distinct and diverse existents were temporally concurrent with him. Moreover, every one of those existents is itself such that Koriscon's existence is simultaneous with it. Accordingly, insofar as the now which designates Koriscon may be taken instead to designate one of those other simultaneous existents (or, insofar as it may be taken to implicitly designate not only Koriscon but Koriscon along with every existent which exists simultaneously with him), then it does make sense to say that the time at which Koriscon exists would still exist even if he did not.

This, however, does not clarify Aristotle's previous argument regarding how the now may be thought of as both same and different. The central image in that argument was Koriscon. On the one hand, Koriscon is a different existent insofar as he is first in the gymnasium and is then in the market-place. Presumably, too, he is concordantly different-and-again-different as he strolls from the gymnasium to the market-place. And yet, Koriscon himself is one and the same natural existent when he is in the gymnasium and when he is in the market-place, and presumably throughout his stroll from the one to the other.

The gist of Aristotle's argument now thus seems reasonably clear. Koriscon is at the gymnasium. He leaves the gymnasium, strolling towards the market-place. He strolls through the outskirts of Athens into midtown. He arrives at the market-place, stops strolling, and so is

then at the marketplace. Moreover, Koriscon's strolling motion, from its onset at the gymnasium to its culmination at the market-place, delineates a certain stretch of time. That is, it takes a certain amount of time for Koriscon to stroll from the gymnasium to the market-place; and that amount of time is just the amount of time which passes while Koriscon strolls from the gymnasium to the market-place. But, this strolling-motion from the one place to the other is also "one" continuous motion which therein "measures" a certain continuous stretch of time only because of Koriscon, only because Koriscon is a certain "one" natural existent who continuously performs this strolling motion from its onset to its culmination.

A certain stretch of time is not the only magnitude, though, delineated by Koriscon's strolling motion. It also delineates, for example, a certain distance. If there happens to be an entirely straight route from the gymnasium to the market-place, and Koriscon takes that route, then the distance he traverses by virtue of his strolling motion will be just the (straight) distance from the gymnasium to the market-place. Whether or not there is such a route, however, and whether or not he takes that route, the actual distance delineated by his strolling motion is indeed delineated just by his strolling motion and not by anything other than his strolling motion. What, then, distinguishes the time delineated by Koriscon's strolling motion from, for instance, the distance delineated by his strolling motion?

At least in regards to our ability to cognitively discern time, Aristotle's previous discussion implies that the answer to this question requires the *now*—as perhaps opposed, for example, to the *here*. To cognitively discern a certain magnitude which may be ascribed to, or thought to "number," a certain continuous motion, we must designate or cognitively focus on a certain natural existent—in particular, the natural existent which is continuously performing that movement.

Insofar as we designate that natural existent in a *HERE* sort of way, as it were, the magnitude we cognitively discern is its distance. Perhaps, similarly, insofar as we focus on that natural existent in a *THIS* sort of way, the magnitude we cognitively discern is a sort of magnitude or amount just of motion as such. But, insofar as we focus on that natural existent in a *NOW* sort of way, the magnitude we cognitively discern is its time—more precisely, the time it takes the natural existent to perform that motion. In this way, on the one hand, what the now designates is the natural existent performing a certain motion while, on the other hand, the time which corresponds to the motion is delineated by

reference to the now (that is, to the natural existent it designates) when we focus on that natural existent in a temporally cognitional manner.

Again, though, while Aristotle's remarks concerning the now seem most intelligible if we think of the now as first and foremost a feature our cognitive capabilities and processes, he intends it thereby to designate or correspond to some real (irreducibly distinctive) feature of natural existence as well. The now does not merely designate Koriscon, for example, but in focusing our cognition on Koriscon as a real temporal existent it is designating something which exists in reality now—as opposed, say, to Galen or to Solon, which in the context of Aristotle's own cognition or at least discussion do not exist in reality now.

Surely, in other words, designating Koriscon as a now-existent is not merely a feature of how we happen to be thinking about Koriscon but relates to some feature of his existence which is indeed appropriately expressed by designating him as temporally existent, as existent now. If, for current discussion at least, we characterize this as just Koriscon's own now-ness, presumably the sense in which Koriscon is said to be different even as he also remains the same likewise indicates how Aristotle's discussion shows the now to be different even while it emphasizes the now's sameness.

Aristotle's discussion intimates, in particular, two related ways in which Koriscon is different even while he remains Koriscon. First, at the onset of his strolling motion he is at the gymnasium whereas at the culmination of his strolling motion he is at the market-place. Second, during his strolling motion Koriscon is continuously different-and-again-different as his strolling motion conveys him through the streets of Athens, farther and farther from its start terminus at the gymnasium and nearer and nearer to its end terminus at the market-place.

Insofar as his start terminus is different from his end terminus (and they must be if there is to be local-motion from the one to the other) and everywhere in between is continuously different from anywhere else in between, Koriscon may be thought of as himself different (or, in Aristotle's terms, he may be "described differently") inasmuch as he is the (real) natural existent to which those differences pertain (or, in Aristotle's terms, which "endures" or "persists through" those differences).

Perhaps we are to think of the now as also different correspondently. At the onset of Koriscon's strolling movement, the now was the now of Koriscon's being at the gymnasium; at the culmination of his stroll, the now was the now of his being at the market-place; and in between the

now was continuously the now of wherever Koriscon was in the course of his continuously different-and-again-different strolling motion. Does this imply, then, that we are to think of the now as itself (like Koriscon) somehow also moving, and so in that sense being always different?

The best answer to this question would seem to be "yes and no." The "no" part seems straightforward. Though a real feature of natural existence, the now is not as such itself a natural existent. Hence, it also is not the sort of thing which can as such move or change. Chameleons, leafs, planetary bodies, sense organs, and Koriscon are the sorts of things which move and change in Aristotle's world; not such items as the now.

In more general terms, the now has been characterized as designating what in reality exists at a given time. What it designates may move or change; and insofar as the now designates that existent it continues to designate it, and so to "correspond to" to it, even as that existent moves or changes. Still, it is the natural existent which changes, and not the now.

On the other hand, insofar as the now continues to designate a certain natural existent as it moves or changes, surely there must be some sense to saying that it does also "move." Thus, recall Aristotle's initial argument (presented in Chapter 4) supposing that the now itself is always different-and-again-different. The argument supposed, in particular, that the now was itself a certain sort of whole having diverse or different-and-again-different nows as its constitutive parts. In addition, the argument also supposed that the sort of whole which the now is must be inherently temporal. It must be analogous to, or perhaps in some way correspond to, time itself. The differences between its nows must be temporally dynamic in character.

Accordingly, the now could not be some sort of static time-like dimension—for example, one consisting of equally and concurrently real indivisible times-when, times-at-which, slices-of-time, or the like. The differences between such a dimension's nows would, on the contrary, have to allow for the fact that no two of them can exist concurrently. More precisely, they must be related to one another in a sequentially before-and-after manner wherein each prior (before) now can no longer exist but must have ceased to exist before the subsequent (after) now exists. But, that argument continued, this leads to certain impossibilities.

Aristotle's current discussion does not abandon this analysis of how to think about the now were it constituted of different-and-again-differ-

ent nows, nor the *reductio* (incoherence) implications were this the case. Rather, his current insistence that the now as such always remains the same seems meant first and foremost to replace, or at least emend, that earlier argument's supposition that the now is a certain sort of whole having diverse and different nows as its constitutive parts.

The point seems to be that, when we think of the now as designating what in reality exists at a given time, we are not to think of there existing a sequential ordering of different nows, each one designating what in reality exists at a certain time; but rather we are to think of the now as continuously designating what in reality exists as those natural existents move or change and indeed as they are themselves generated (come into real existence) and perish (pass out of real existence). Insofar as the now is thus to be thought of as continuously designating, or "corresponding to," the real existents constituting the natural universe, in at least that sense it seems appropriate to think of it as moving.

If this is Aristotle's point, though, one might wonder whether it avoids his initial argument (discussed in Chapter 4) against the now's remaining always one and the same. That argument proffered two main reasons against this. First, the now terminates determinate extents of time and any determinate magnitude requires two different termini to terminate it. Second, simultaneity (temporal concurrence) is a matter of existing at or in relation to the same now, and so every natural existent or state of affairs whatsoever would exist simultaneously with every other one.

In the first regard, surely Aristotle's current shift from the now as terminator of temporal stretches to the now as designator of temporal existents is not meant to abandon entirely that previous role or sense of the now. In the second regard, Aristotle's current point clearly intends in fact to uphold simultaneity.

Recall, in particular, that what Aristotle seems to mean by the now's designating what in reality exists *at a time* is at least partly that in designating a certain natural existent the now implicitly designates also every other natural existent whose existence is simultaneous with its designee's existence. If the now always remains the same, though, this might seem to imply that no matter what natural existent it designates it indeed implicitly designates also every other natural existent whatsoever.

The first objection to supposing that the now always remains the same is readily dealt with in our current context. Surely, when the now is thought to comprise the two termini for a certain continuous stretch of time, we are not to suppose that it is *simultaneously* both termini.

In the Korsicon example, for instance, the termini of the distance he traverses are indeed not one and the same. One of its termini is the gymnasium and the other is the market-place; and the gymnasium is not located where the market-place is located and the market-place is not located where the gymnasium is located. Concordantly, the termini of the time it takes him to stroll from the gymnasium to the market-place are likewise different—the one designating Korsicon at the onset of his stroll (when he is at the gymnasium) and the other designating Korsicon at the culmination of his stroll (when he is at the market-place).

And yet, the current claim is that this does not imply that they must therefore in fact be different nows. Rather, the now which designates Korsicon at the gymnasium continues to designate him (continuously) as he strolls towards the market-place until it also designates him at the market-place. In this way, the same now is in fact both the start-terminus and the end-terminus of the time it takes for Koriscon to stroll from the gymnasium to the market-place even while those termini themselves are indeed different termini—the one being its start-terminus and not its end-terminus, and the other being its end-terminus and not its start-terminus.

It is not so clear, however, how the second objection in Aristotle's earlier argument against supposing that the now always remains the same may be dealt with in our current context. Perhaps a clue may be found in Aristotle's current use of the before-and-after notion. In particular, a subtle but pivotal shift seems to be occurring in his appeal to the before-and-after relationship.

In his argument centering around the Koriscon example, Aristotle avers: "For, it is by reference to what endures that we cognitively discern before and after regarding its motion … for, it is by virtue of what is being numerated by reference to what endures being before and after that the now pertains to motion." In part, this suggests that Koriscon's start-terminus' being at the gymnasium and his end-terminus' being at the market-place (and perhaps as well the continuously different-and-again-different character of his strolling motion in between these two termini) may be perceived or thought about in terms of before-and-after only because of Koriscon's role in all of this—only because Koriscon indeed begins his stroll at the gymnasium and ends it at the market-place, and in between performs the strolling motion which gets him from the one terminus to the other one. It may, however, suggest more than this.

In particular, Aristotle also links the amount of time Koriscon's stroll takes (that is, what is being "numerated") with the now's role in designating Koriscon initially at the gymnasium, later in the market-place, and continuously in between. This is, of course, in keeping with the sense in which I have suggested one may think of the now as in its own way "moving" as it designates and corresponds to Koriscon and his motion.

Aristotle subsequently adds, however, that the upshot of this is that "time is both continuous by reference to the now and also divided in accordance with the now." Presumably, this dividing also has something to do with the way in which before-and-after pertains, for example, to Korsicon and his stroll from the gymnasium to the market-place. If so, it suggests that the now plays a role, not only in continuously delineating time in a before-and-after sort of sequential order, but also in effect in "dividing" before and after as such.

In these terms, *before-now* and *after-now* seems no longer to distinguish one now from another now by virtue of the former existing before the latter and the latter existing after the former; rather, it seems to distinguish what exists before now and what exists after (one and the same) now.

Earlier discussion suggested that when Aristotle talks about the now designating what in reality exists at a given time, the sense of 'at a given time' is a matter of Aristotle's imputing to the now first and foremost an implicit designative function regarding all natural existents which simultaneously exist, but secondarily (by implication) also a discriminative function regarding those natural existents and other natural existents which may exist asynchronously (as it were, at other times) in relation to them.

Far from obliterating all asynchronic temporal relationships, as our current always-the-same now continuously designates what in reality exists it thereby continuously also demarcates, on the one hand, what no longer exists as well as, on the other hand, what does not yet exist. In at least the former regard, moreover, it presumably does so in such a way that what no longer exists is temporally related to what does in reality exist by determinate amounts or stretches of time—amounts which we may "number," for example, in terms of days or years or centuries.

Accordingly, as Aristotle says later, "the same time concurrently exists everywhere; whereas before and after are not the same [time]. For, while currently existent (*parousa*) change is in that respect one,

what has already occurred and what is yet to occur are in that respect different" [IV.220b5–8].

The now's relationship to real existence thus in a way echoes the nature of time itself. All temporally concurrent (simultaneous) existents in the natural universe are therein temporally the same whereas everything which has already occurred before those existents and everything which is yet to occur after those existents are therein not temporally the same but temporally different.

The only sense in which asynchronic temporal existents may be thought of as somehow still being the same, Aristotle continues, is insofar as we think of time as cyclical or recurring in certain ways: "Just as it is possible to think of a motion as being one and the same over and over again, so too is it possible to think of time similarly—as, for example, regarding a year or a Spring or an Autumn" [IV.220b13f.]. Properly speaking, however, even cyclical or recurrent times such as these are not temporally the same. What recurs are certain sorts of motions or natural processes which occur "over and over again." One year does not pass synchronously with another year but always before or after it.

Aristotle's subtle yet significant shift in how we are to think about the now, accordingly, intimates a similarly subtle yet significant shift in how we are to think about time. Until now, Aristotle's positive account of the reality and nature of time has tended to think of time (as we "always encounter or come across it") mainly as something which passes and whose passing we are able to perceive or cognitively discern (and so "numerate" or "measure") to pass in determinate amounts concordantly with perceiving or cognitively discerning motions or natural processes in our surrounding environment.

Aristotle's current discussion does not contradict, nor even substantially depart from, that way of thinking about time. Yet, Aristotle's remark that "time is both continuous by reference to the now and also divided in accordance with the now" intimates at least a partial return to the perhaps more fundamental notion of time implicit in his initial discussion of Parmenidean challenges to the reality of time—that is, to time as constituted of past and future, of what *already has been* but *is not* any longer and of what *is yet to be* but *is not* yet.

It is not merely the case that a certain determinate stretch of time is delineated by Koriscon's strolling motion from the gymnasium to the market-place. That this determinate extent or magnitude is indeed a determinate stretch of time is manifest by the fact that, while it passes,

Koriscon already has been at his start-terminus (the gymnasium) and is yet to be at his end-terminus (the market-place) and indeed, while it passes, Koriscon's strolling motion continuously divides into a part which has already occurred and a part which is yet to occur.

That time should not be conflated with the natural processes which provide us the occasions, or means by which, we may be aware of it can also be seen, for example, in the fact that [IV.221a26–28]:

> Since something which exists in time thereby exists in [a certain sort of] number, it is possible to postulate a time greater than everything real which exists in time. Thus, all real things which exist in time must necessarily be encompassed (*periechesthai*) by time.

Aristotle is not maintaining that time is greater—more expansive somehow—than the natural universe, nor that time is something distinct or separate from natural existence.

Part of his point here may be that time does not begin when any given natural existent or any given natural process begins, and nor does it end when that natural existent or process ends. The temporality of natural existence is such that prior to any given natural existent or process other natural existents and processes already have been or have occurred, and subsequent to any given natural existent or process there are other natural existents and processes which are yet to be or to occur.

Aristotle also may be suggesting, though, that were we in a way to suspend the distinction between past existents and future existents sufficiently to imagine a sort of totality of all real existents, whatever the "size" of that totality may be we could still imagine as well that other existents may already have been before even the earliest members of that totality and that other existents are yet to exist after even the latest members of that totality. In other words, no matter how temporally huge or "numbered" we suppose natural existence to be, we can always suppose that it is even temporally huger—presumably with respect to both of its temporal directions.

Indeed, in attempting to disentangle what distinguishes time from natural existence as such, we have seen that Aristotle seems to be paying increasing attention to pastness and futurity. Regarding the now (whether explicitly as a feature of human temporal cognition, or as a continuously implicit yet real feature of natural existence as potentially an object for such cognition) Aristotle thus explains further [IV.222a10–19]:

> The now exists by virtue of the continuousness (*synexeia*) of time, as has been seen, inasmuch as it continuously links together past time and future time. It is thereby also a terminus in regards to time, inasmuch as it designates both the beginning of future time and the culmination of past time … It divides time potentially (*dynamei*) and, insofar as it does this, the now is always different; whereas, insofar as it also links together past time and future time, it is always the same … Hence, in one sense the now divides time in accordance with its potential divisibility and in another sense it is the terminus both of past time and of future time, while also denoting their unification.

Aristotle may be inviting us here to think about time in abstraction from real (natural) existence. We may do so by thinking of time as a certain sort of continuum. In particular, we may think of it as a continuum divisible anywhere into two parts, past-time and future-time.

Dividing it in this way, however, does not in fact fracture or sunder time into two distinct times. It remains a unified continuum—as indicated by the fact that, wherever we divide it, one and the same divisor "terminates" both past time and future time. The culmination of past time is the onset of future time, and the onset of future time is the culmination of past time. Moreover, we can think of this divisor as the now.

Insofar as we can thus divide time into (always) different past and future times, this now is always different. Insofar as wherever we divide time it remains a continuum wherein the end-terminus of the past is also the start-terminus of the future, this now is always the same.

This way of understanding Aristotle's argument seems especially implicit in his associating the now's potential to divide time with time's potential divisibility. In light of Aristotle's initial association here of time's continuousness with the now's continuous linking of its two parts, however, he may also be inviting us to understand his argument in the context of his previous discussion of the now and real existents.

In those terms, consider the now as designating what in reality exists at a given time—for example, our friend Koriscon. As Koriscon strolls from the gymnasium to the market-place, he is continuously demarcating past time and future time. Indeed, throughout his life, he has been continuously demarcating past time and future time.

Generalizing even further, the continuous ongoing existential process or "motion" of what in reality exists continuously demarcates past and future—those existents, processes, or process-parts which already have existed or occurred from those which are yet to exist or occur. In these terms, too, the sense here of referring to the now as both always different and always the same in a way repeats Aristotle's previous

discussion, but with the addition that the now is also one and the same in that what it designates is (always) both the end of past time and the beginning of future time.

Today, we are used to thinking of the natural universe as having a temporal beginning which coincides with its supposed physical beginning—for example, the infamous Big Bang. Accordingly, it is normal for us to think of *today* as just another time or concurrence of natural existents on a temporal continuum which began when the natural universe began and which will continue until such time as when the natural universe ends—for example, in the Big Crunch, or at the Big Fizzle.

This, however, is not Aristotle's way of thinking about the natural universe and its temporal existence. To be sure, for him "today" is in effect just a certain concurrence of natural existents—in particular, those which currently exist, including for current purposes you and me. But, also for him, any such "day" or "time" is just a certain concurrence of natural existents—which for Aristotle, as he was composing Book IV of *Physics*, included himself and his contemporaries in Greece and Macedonia.

Accordingly, for anyone writing about time (for example, Aristotle, or Bertrand Russell, or me) or reading about time (for example, you) "today" consists of that person and whatever other natural existents exist concurrently with his or her writing or reading about time. In more general and abstract terms, we might say for Aristotle that *what time today is* is a matter of where the natural universe is in its continuous ongoing existential movement—as it were, in its unending (and unbegan) unfolding of real existence.

Not surprisingly, past and future are understood by Aristotle in similar terms: Not by reference to a temporal beginning to our universe, and where we happen to be in its subsequent progress since that beginning, but by reference to whatever "today" happens to be (to the real existents which happen to constitute it).

In Aristotle's account of time, designating what I am colloquially characterizing here as *today* is the job of the now. Accordingly, such notions as a *particular time* or a *time-when* must for Aristotle be understood in terms of his notion of *the now*. He thus argues, for example, that [IV.222125–29]:

> *When* denotes time as demarcated by the potentially dividing now—as, for example, *when Troy was seized* and *when there will be a flood*. For, the *when* here must be demarcated by reference to the now; and, assuredly, there

> shall also be a certain [amount of] time which is thereby delineated from *this* time to *that* time—inasmuch as, otherwise, every time will then be demarcated as the same *when*.

This potentially dividing now is, of course, the now as it continuously demarcates past and future during the ongoing march of real natural existence "from" the past "towards" the future.

In this context, *when Troy was seized* designates a certain time or, as it were, a certain "today" in that ongoing march (a particular concurrence of certain natural existents which included Troy and the seizing of Troy), and the time it designates demarcates a certain past and future. Whereas, Aristotle's time or "today" is a different concurrence of different natural existents. It also demarcates a certain past and future.

The nature of temporal existence, however, is such that Aristotle's past includes Troy's past. That is, everything which had already existed or occurred when Troy was seized also lies in Aristotle's past, but in addition the seizing of Troy and everything else which existed or occurred in between the seizing of Troy and the now designating Aristotle or his "day" (more precisely, the now which Aristotle would have been using to designate his "day") are also part of Aristotle's past—though these latter had previously been part of Troy's future.

In other words, *times-when* are not to be explicated for Aristotle as particular locations on or "moments" in some sort of time-line but, once again, in terms of the continuous ongoing existential movement of (real) natural existence and in terms of the now as both explicitly a feature of human temporal cognition and implicitly a real feature of that existential procession.

In this regard, Aristotle's earlier insistence that time "as we always encounter or come across it" is always delineated by two different now-termini gives way to a sense in which time requires only a single terminus—a single terminus for past time and a single terminus for future time, where these are in fact one and the same terminus having a dual function. In light of this, Aristotle argues as well [IV.22b1–7]:

> Inasmuch as the now is thus both a completion and a beginning in regards to time—although these notions do not as such denote the same time but rather the culmination of past time and the beginning of future time—it follows that, just as what is circular is somehow both convex and concave by virtue of the same thing [for instance, an arc's curvature], so too is it the case that time is always both at a beginning and at a culmination; and because of this time seems to be always different,

> inasmuch as the now is not a beginning and a culmination of time in the same sense [but in one sense for future time and in another sense for past time]. Otherwise, time would exist in accordance with itself in contrary respects concurrently. Nevertheless, *time will therefore never exhaust itself since it is always at a beginning.*

To Aristotle's final conclusion here, we may of course add that time also cannot as such have a beginning since it is always at a culmination—since it always has, and so had, a past.

Perhaps more important, though, is the exclamation point this argument seems to add to the current suggestion that for Aristotle the primary or most fundamental way to conceive the reality and nature of time is, first, as constituted of past and future and, second, as pertaining to natural existence as itself a dynamic process wherein what is real is continuously becoming or passing away into what already has been real while also continuously becoming or approaching what is yet to be real.

Aristotle thus posits: "In time all things come-to-be and perish" [IV.222b16f.]. Before things come-to-be, they are not yet. After they perish, they no longer are. But, still, what about while they *are*? Assuredly, then they most properly *exist* in or with respect to time. And yet, *are*—or *is*—is not a part of time for Aristotle. Time for Aristotle consists of past and future, of what has been and what is not yet.

Time never stands still. Even insofar as a particular natural existent is at rest, and is not moving or discernibly changing, time passes. The natural existent still moves temporally. Perhaps for it itself to *be*, despite Aristotle's continuously dividing now, is as much for it to endure or persist (at least for a certain stretch of time) this existential motion as it is for it to endure or persist the natural motions and changes it performs or undergoes during its time in natural existence.

Insofar as whatever sorts of identity conditions or existential principles underwrite our thinking of a natural existent as remaining one and the same for a stretch of time do pertain to a certain natural existent, perhaps in this sense we can say that it *is* even while it itself continuously *has been* and—until such time as it finally perishes—*is yet to be*.

Aristotle recognizes, though, that we do not think about all past time and all future time in the same way. He tells us, for example, that [IV.222b7–14]:

> *Presently* is that part of future time which is near the indivisible present now (*tou parontos nun atomou*)—for example, When are you going for walk? 'Presently,' inasmuch as the time when he shall do so is near—and that

> part of past time which is not far from the now—for example, When are you going for a walk? 'I have presently been walking.' Whereas, we do not say that Troy has presently been seized, inasmuch as this happened too far distant from the now.
>
> *Recently* is also that part of past time which is near the present now (*tou parontos nun*). For example, when did you go? 'Recently,' if the time was near the current now (*tou enestotos nun*). Whereas, *long ago* is far distant from the current now.

What many people commonly think of as the present consists for Aristotle of the very very recent past (as discussed in Chapter 6), and maybe the very very imminent future, relative to the present now. But, what is the present (or current) now?

It is no accident, I think, that Aristotle's remarks here regarding *presently* and *recently* are presented in the form of a hypothetical dialogue. Earlier discussion suggested that we think of 'currently existing things' as denoting the totality of things existing simultaneously with some one designated thing (for example, Koriscon, or maybe Koriscon-at-the-gymnasium) or, in more abstract terms, as denoting whatever totality of simultaneously existing things in reality exist just by virtue of the continuous ongoing temporality of real existence, as this may be designated now-ishly by any temporally aware beings amid that totality.

Insofar as someone might require more than this to designate what "currently existing things" in fact *are* the current ones, earlier discussion suggested that this demand rests on the reader or other reflective agent including himself among the simultaneous cohort comprising currently existing things, and wondering what makes him (or his existence) special, maybe privileged, in this regard.

Accordingly, perhaps the *present* or *current* now mentioned in Aristotle's remarks is whatever now someone who is asked 'When are you going for a walk?' or 'When did you go for a walk?' takes as his own reference-now when cognitively determining whether to respond with a certain present-tensed, past-tensed, or future-tensed answer.

Allan Back, in his discussion of Aristotle's sea battle argument in *On Interpretation*, makes the point:

> When Aristotle talks of affirmations and denials, he is talking both of the relation of predicates to subject and of an additional determination of time. Today we tend to separate the two in logical analysis: the timeless statement and the temporal index. But Aristotle did not have this terminology ready made. What is always true for Aristotle must be the predications proper. Yet at the same time Aristotle insists that

> statements (*logoi*) and assertions (*apophaseis*) are tied to time (*Categories* 4a23–b4; *On Interpretation* 16b6–10). [Back, 139]

Back's particular concern are the issues regarding truth value and modalities raised by Aristotle's sea battle argument. In that regard, Back summarizes his point by insisting that for Aristotle "the time of the utterance and the existence of the speaker make a difference in the truth value of the statements made" [Back, 148]. Indeed, we might add on Back's behalf, our own attempts to make sense of what Aristotle says and argues regarding his sea battle require us to think of ourselves as his contemporaries—or, conversely, to think of the sea battle as pertaining to ourselves and to our own (present) *now* as the one dividing past and future.

Here, though, Back's particular concern (Aristotle's sea-battle) is not important. What is important is that for Aristotle language always partly expresses, and even mirrors, particular cognitive judgments and thoughts in the particular context of their agent. Human cognition includes the capability to designate and think about the present (what *is*) and to distinguish this from the past and the future (what *was* or *has been* and what *will be* or *is yet to be*), as well as to render various judgments and discernments regarding these.

It is hasty, though, to identify all grammatically present-tensed (public or private) discourse as temporally present-tensed. Significant portions of our daily communications and conversations about ourselves and our activities, about things and activities unfolding around us, and the like, do not require nor especially call for us to mobilize these temporal distinctions, much less even finer temporal discriminations. Nor do significant portions of our "inner conversations" about ourselves and our surroundings. On the other hand, our cognitive and linguistic resources for thinking and talking about past and future do require, and maybe only make sense, alongside our cognitive and linguistic resources for thinking and talking about *is*, or *what is*—not merely as the subject(s) of grammatically present-tensed assertions but as comprising a temporal present, or what currently exists.

Arguably, then, the present is central to our thinking and judgments about time. Aristotle maintains, however, that it is not to be included among the parts of time constituting temporal existence as such. The constitutive parts of time are past and future. Natural order is a matter of existing nearer to or farther way from what *in reality* currently exists, or what currently *is real*—but where *currently* is the culmination of what

has been but is no longer real, and the beginning of what is yet to be but is not yet real.

To be sure, *currently* is also our ongoing reference for temporally present-tensed discourse, insofar as we intend grammatically present-tensed discourse as also expressing a temporal modality distinct from past-tensed or future-tensed discourse. But, *currently*, and its conceptual sibling *the present*, does not denote a certain sort of real existent which occupies or constitutes its own distinct temporal space in between past and future, or which exists distinct from both of these and additional to their one-and-the-same conjointly dividing-yet-unifying terminus as time's constitutive parts. But, how can this be?

Maybe the now which continuously divides and unifies time designates what ontically is a sort of limit to real existence itself—a sort of apogee or apex of existence or "realness" in relation to which natural existents are real in proportion to their degree of nearness to or farness from the now. Real existents are then, for Aristotle, those whose existential character or status is "close enough" to this ideal of real existence, say, to be considered more real than not. This proposal has been floated before; but it is difficult either to uphold or to refute based on Aristotle's text.

For instance, something has real existence for Aristotle insofar as it has been generated and has not yet perished. This is especially the case with his primary substances—trees, horses, rutabagas, and the like.

In one sense, then, primary substances' endurance or persistence during and through a motion or change is a matter of their continuous real existence from their generation until their perishing. And, even before a particular primary substance is generated and again after it perishes, there is still the matter (*hyle*) from which it was generated and into which it shall corrupt.

On the other hand, though, Aristotle seems at time to think of this continuous real existence (on the part of primary substances and their matter) itself in dynamic terms—in terms of a primary substance continuously moving or changing and, in so doing, being designated by the now in its guise as the continuous demarcator of past and future (recall Koriscon). Even primary substances which are ungenerated and imperishable (for example, the Heavenly bodies) are in this regard as much subject to time's passing and its *already has been* and *is not yet* as are terrestrial substances.

A somewhat similar ambiguity, though, will be seen in Aristotle's discussion in Book VI of *Physics* of the reality and nature of motion.

On the one hand, we have already seen Aristotle thinking in Book IV of motion as a certain "magnitude" delineated by a from-which and a to-which—or, a start-terminus and an end-terminus. Korsicon's stroll from the gymnasium to the market-place, in these terms, is a certain existent motion which in reality stretches from the gymnasium to the market-place.

On the other hand, we shall see that in Book VI Aristotle assigns greater responsibility (perhaps even exclusive responsibility) for a motion's actuality to its end-terminus. In these terms, then, a natural motion's own proceeding from its start-terminus to its end-terminus is itself a matter of the motion's striving for actualization, for complete realness. More precisely, the farther from its "beginning" and the closer it comes to its "end" the less potentially real a motion is and the more actually real it is.

Accordingly, in Aristotle's discussion of motion as well, there is reason to suppose that he does not always think of (actually) real existence as all or nothing—that he indeed endorses the notion he introduced at the outset of his investigation of barely, dimly, indistinctly, or the like, real existence.

Further confusing the matter, though, it is not clear that the present now Aristotle mentions in his remarks about *presently* and *recently* is the now which (continuously) delineates past and future. Despite Aristotle's insistence (especially in *On Sense Experience and Sensible Objects*) that there is no such thing as imperceptible time, he thus avers in the context of his remarks concerning *presently* and *recently* that "*suddenly* pertains to what has become different in a time which is imperceptible because of its minuteness" [IV.222b15f.].

In context, Aristotle may have in mind here just that our natural sensory and cognitive faculties are incapable of perceiving and discerning magnitudes (including temporal ones) which fall below a certain threshold. Although no time is imperceptible in the strict and proper sense discussed in *On Sense Experience and Sensible Objects*, in other words, our natural faculties are factually limited in their abilities to perceive or discern amounts of time.

Howsoever uncertain and fuzzy this limit may be, Aristotle may be arguing, insofar as the time which passes while something changes falls below this limit, it seems to us that it has not taken any time at all to change but is just "all the sudden" different. Perhaps it is also in this sense that Aristotle here characterizes the present now as indivisible (*atomos*). Although Aristotle rejects the atomistic notion of

tiniest magnitudes (real magnitudes which, however, are not further divisible), in other words, he may hold that it can seem as if this sort of indivisible exists due to our own perceptual and cognitional limitations.

Still, Aristotle does consider *presently* to be a part or specification of future-time and *recently* to be a part or specification of past-time. The present now cannot be an entirely new (distinct) sort of time, unrelated to the past-future divisor-now. Any amount of time, however tiny, is in fact a continuous stretch of time's passing which itself continuously divides into past and future, or into a part which *has been* and a part which *is not yet*.

The relationship between *is*—or *what is*—and a putative temporal present is even further complicated by Aristotle's recognition of the complexity of temporal cognition, including even just how it is that we perceive time and (or) its passing.

Aristotle's primary purpose in his treatise *On Memory and Recollection* is, as the title assigned to this work intimates, to distinguish and explicate the natures of memory and recollection. He focuses first on memory; and he begins his explication by relating memory to time in that [*On Mem.* 449b11–18]:

> The future cannot be remembered but rather pertains to opinion and expectation … Nor does memory pertain to the present; rather, sense experience does. For, by sense experience we discern neither the future nor the past but only the present (*to paron*). Whereas, memory pertains to the past. For, no one would say that he remembers the present when it is present—for example, a particular white object when he is seeing it.

Aristotle's equation here of discerning the present with discerning, for example, a particular white object when (or as) one is seeing it is interesting, for two reasons.

It reassures us that, when Aristotle talks about sense experience pertaining to the present, he is not supposing that there is some special temporal reality or existent known simply as *the present* but is referring to current existents available to sense experience. It reassures us that to talk about certain sorts of temporal existents is for Aristotle to talk about natural existents in temporal terms.

Secondly, though, Aristotle's phrasing of this equation renders the meaning of "nor does memory pertain to the present" less than obvious. We do not remember the present when it is present, Aristotle states; rather, when it is present we perceive it. This does not entail, however, that memory cannot at all pertain to the present.

In Part I (Chapter 3.4), I postulated that it may be possible to remember the present (or, to remember something in its own presentness). Interestingly, Aristotle seems to consider something like this possibility. His response to this sort of proposal, though, seems to be that such a cognition would not strictly speaking be a case of remembering (an exercising of memory as such). Rather, it in fact seems an excellent example of what Aristotle would consider to be a case of *recollection*. More precisely, Aristotle characterizes *recollection* as a process which culminates in the reoccurrence—a reliving, as it were—of a certain perception or some other "inner motion" which has occurred previously [see *On Mem.* 451b20ff. and 451b33ff.].

How, though, does memory pertain to the past (and therein not to the present)? Aristotle explains that strictly speaking "memory is not perception or cognition but a certain sort of fixed condition (*hexis*) or affection (*pathos*) acquired by these [by perception or cognition] with the passing of time" [*On Mem.* 449b26–29]. Aristotle later offers a couple analogies to clarify his notion here.

The first analogy suggests that we think of the process or change which occurs in a sensory faculty when we perceive a natural existent as analogous to a picture or painting (*zographema*) of that existent rendered in the soul. This picture becomes a memory when, instead of perishing when we are no longer perceiving the natural existent, it has acquired a fixed condition (*hexis*) within the soul.

The second analogy compares the process or change which occurs in a sensory faculty when we perceive some natural existent as analogous to the imprint (*typos*) a signet ring might make in wax. Aristotle's evident notion here, similarly, is that a memory is analogous to the imprint's remaining after the signet ring is removed, and so becoming a fixed condition of the wax [*On Mem.* 450b30–34].

One sense in which memory pertains to the past, accordingly, is that memories are *of* things (their intentional objects) which are no longer present but which were or had been present. They are analogous to portraits which persist even after their subjects are no longer posing for their portraiture, or to imprints which persist in wax even after what imprints them are no longer doing so.

Memory must pertain to the past, though, in a more significant way than this inasmuch as a subsequent awareness of some such mental analog to a painting or a wax impression may just as well be a dream or some other act of fantasy or imagining. It need not be an act of memory (a remembering) as such. As noted earlier, Aristotle in this

context in fact claims that "those [animals] which perceive time are the only animals capable of remembering; and memory is what enables us to perceive time" [*On Mem.*449b32 f.].

One sense in which memory enables us to perceive time is that remembering itself requires a certain temporal awareness. At the very least, it requires an awareness that what we are remembering existed or occurred temporally prior to other things which exist or have existed, which occur or have occurred, after it: "Always, when an act of memory occurs, … we are aware that we have heard or seen or learned about this thing previously. What is previous and what is subsequent, however, pertains to time" [*On Mem.* 450a21–24].

We may, of course, also be aware of having previously perceived or thought about something, for example, while dreaming about it. Presumably, though, Aristotle would maintain that in such cases we thereby are also remembering it, and not only dreaming about it.

Another sense in which memory enables us to perceive time for Aristotle seems to be that memory itself (as a faculty of the soul) in a way keeps track of time or its passing. He argues that, to account for our ability to cognitively discern time [*On Mem.* 452b9–14]:

> let us propose that there exists something which enables us to judge greater and lesser extents [of time]. It seems reasonable for us to account for this as in the case of magnitudes. For, we think about (*noei*) large and distant objects not by our thought processes (*dianoia*) extending out to where they are, as some allege regarding sight, … but by a process occurring [in the soul] which corresponds to (*analogon*) their size and distance. For, there then exists in us schemata and processes which are resemblances (*ta homoia*) of these.

Aristotle here provides important clarification of his earlier analogies with paintings and wax impressions.

In particular, insofar as we think of states or processes in the soul resembling natural existents and processes in our surrounding environment, we need not think of them precisely replicating those objects but, rather, in some systematic manner corresponding to them. When I am cognizant of a certain large and distant object, for example, there does not exist within me a "resemblance" which is as large as the object, nor which includes a distance component equal in magnitude to my distance from the object.

Especially interesting here, though, is Aristotle's indication that these "resemblances" in the soul systematically correspond to objects with respect to distance as well as, for example, with respect to size. Aristotle

proposes that we adopt a similar notion in characterizing how memory enables us to perceive "magnitudes" of time; and, he seems to attribute this ability to keep track of—to systematically encode, as it were—extents of time pertaining to our experiences and their objects to our faculty of memory.

Aristotle thus maintains that strictly speaking accurate memory requires that the ("fixed") resemblance in the soul of something a person remembers must correspond both to the perceived object (perhaps meaning that the resemblance has not degraded or distorted over time) and to the actual time which has passed since it was perceived [see *On Mem.* 452b26 ff.].

Aristotle indicates that we do not always require this second component for "correct" memory, though, "as for example when [we remember just] someone doing something the day before yesterday" [453a1 f.]. Still, even here, there remains some reference to elapsed time, a sense of some amount of time having passed. Moreover, regarding the original notion that accurate memory includes the actual time which has passed, caution is in order.

The notion of memory's systematic correspondence with what has been experienced applies to the passing of time as much as to the experienced objects. Indeed, an analogy comparing Aristotle's conception of human memory with an internal tape- or video-recording device may be even more misleading regarding memory's time-keeping or -tracking function than regarding its experience-retaining or object-"fixing" function.

Aristotle, we must remember, does not think, for example, in terms of seconds (or even "standard" hours). Rather, his examples of the sorts of recurring phenomena which ground our conceptions of determinate amounts of time include the four seasons and the diurnal occurrence of light and dark [see IV.223b12–24]. Still, what is important here is Aristotle's contention that doing this is a part of memory's functioning.

Aristotle postulated in *On Memory and Recollection* that "by sense experience we discern neither the future nor the past but only the present." His remarks there regarding sense experience and memory, however, need to be understood in the context of their roles as faculties of the soul. That is, those remarks pertain first and foremost to our temporal awareness or cognition, and to their objects indeed as those faculties' (intentional) objects. Consequently, they need not be inconsistent with Aristotle's doctrine that the now (so also the present now) is not a part of time, that the parts of time are the past and future.

For Aristotle, *the present*, as what sense experience is *of*, most plausibly denotes the occurrent objects of someone's sense experience (and perhaps also whatever else exists or occurs simultaneously with those experiential objects)—*albeit* with respect to (or, implicit reference to) sense experience's role in temporal cognition. To state that this coffee cup I am seeing exists *in the present*, in other words, amounts to saying that this coffee cup is a real existent in my surrounding environment and I am seeing (perceiving) it. Thus, by implication, I am not remembering it, imagining it, dreaming about it, or the like. Presumably, to state that the coffee cups in my closed kitchen cabinet also exist in the present amount to saying that they are real existents and they exist simultaneously with the coffee cup I am seeing (perceiving).

Still, the present pertains to the present now, and not to any other now. The coffee cup does not wear its temporality on its perceptible sleeve the way it wears its color and shape and size, or other "sensibles." An intriguing possibility is that one's occurrent object(s) of sense experience are discernible as pertaining to the (temporally) present-now in virtue of their imminent relation to memory as the content (or intentional objects) of one's sense experience (continuously) changes.

Perceptible objects arise in our sensory awareness, but they do not abide there. They continuously pass out of our sensory awareness as they are continuously supplanted by other perceptible objects. This does not preclude that these "different" objects may in fact include one and the same object(s)—for example, the coffee cup sitting on my desk, or Koriscon as he strolls to the market-place.

The important point, though, is that a perceptible object in a way is not an object of temporal cognition until or insofar as it falls under the purview of another cognitive faculty (with respect to its temporal presentness)—especially of memory, and especially as memory interacts or interfaces with sensory perception.

The present now is the terminus of remembered (past) experience as much as it is the terminus of the past as such. In this respect, too, perhaps we can see how or why for Aristotle the present is not a part of time, a distinct locale or mode of temporality (most evidently in regards to the past, but also in regards to the future).

CHAPTER EIGHT

DOES ARISTOTLE REFUTE ELEATICISM?

One of the principal functions we have seen Aristotle assign to the now in Book IV of *Physics* is that of temporal terminus (*peras*) or extremity (*akron* or *eschaton*). Previously, Aristotle had argued, against the possibility of the now's remaining always one and the same, that nothing continuous and determinately extended can have just one terminus. Aristotle's more recent discussion of the now confirmed this viewpoint. The time which passed while his heroes of Sardinia slept needed to be terminated by two nows—one related to their falling asleep and another relating to their awakening—or else no time will have passed while they slept. Later, Aristotle integrated this requirement with the notion that a temporal extent also requires a before and an after, and characterized our cognition of time's passing as involving our soul postulating a before-extremity-now and an after-extremity-now, thereby delineating a certain extent of time.

Subsequently, though, as time's (ongoing, anewing, dynamic) continuousness overshadowed its extension in Aristotle's discussion, the now emerged also as a different sort of terminus—as a terminus which is both "two" insofar as it terminates past-time and also future-time, and yet is "one" insofar as it does so just by continuously demarcating them, conjointly culminating past-time and commencing future-time.

I have proposed that these differing notions of the now as terminus need not be incompatible insofar as the now may be thought to demarcate a particular extent of time as it proceeds dynamically in its demarcation function from the start of that extent to its end.

In Book VI of *Physics*—especially in the context of Aristotle's attempts there to reply to Zeno of Elea's attacks on the reality of motion—the previous notion of time as always existing as a certain determinate extent and doing so by having its existence terminated by two extremities or delimiters once again dominates. Indeed, scholars and commentators have understandably tended not to discern a genuinely dynamic notion of time operating in the text of Book VI. As Sherover says regarding the dominant image of time conveyed in Aristotle's account of motion: "Aristotle's working concept of time is strangely

static; it lacks the dynamic aspect of time … which his preoccupation with motion might have urged" [Sherover, 27].

Christensen, recall from Chapter 2, characterizes static-time as also *space-like* time, inasmuch as "[o]bjects do not move successively from one time to another but are spread across time" [Christensen, 145]. Koriscon's stroll from the gymnasium, on this portrayal, is not ultimately to be explicated in terms of a three-dimensional object (Koriscon) whose continuous strolling motion leaves the gymnasium farther and farther behind (temporally as well as spatially) even while it also brings him nearer and nearer to the market-place. Rather, his stroll is to be explicated as a feature of a four-dimensional object (for example, Koriscon-strolling-from-the-gymnasium-to-the-market-place) which extends from the gymnasium to the market-place.

On the space-like time conception, our common notion that Koriscon, or his strolling motion, leaves the one behind and approaches the other is akin to the manner in which the Bay Bridge leaves San Francisco behind and approaches Oakland. Strictly speaking, the Bay Bridge simply extends from San Francisco to Oakland. It spans the spatial distance between the two. Space-like time thinks of time as a fourth-dimension which in a like manner spans purported temporal distances between purported temporal locations.

This image of time as space-like comports well with how Aristotle seems in Book VI to portray time as it relates to motion, especially in his responses to Zeno. Still, the notion that Aristotle harbors a more fundamental image of time as genuinely dynamic is not entirely indiscernible in his discussion there of the reality and nature of motion. At the very least, his discussion of motion in Book VI does not seem incompatible with his discussion of time in Book IV, where we have seen strong reason to claim that he propounds an authentically dynamic conception of time.

Aristotle's extremely brief discussion of time in his *Categories* may also be read as an attempt to portray time dynamically. There, Aristotle again characterizes time as continuous by virtue of its being "joined together by the now with a view towards (*pros*) the past and the future" [*Cat.* 5a7 f.]. Moreover, while we have seen that in *Physics* Aristotle introduces temporal before-and-after as dependent on or at least derivative from spatial before-and-after, in *Categories* Aristotle seems more concerned to emphasize the difference between spatial relationships and temporal ones.

Space and time both fall within the category of *quantity*, wherein they

are further categorized as continuous quantities (in contrast to discrete quantities). As quantities, they have in common as well that both may be thought to consist of parts, or to have parts which constitute them. In this regard, though, "some quantities are constituted of parts by virtue of the relative positioning (*thesin*) they bear to one another within it; whereas, others are not constituted of parts having such a relative positioning within it" [*Cat.* 4b21 f.]. Here, moreover, is where space and time part company.

Aristotle argues that parts of space (and those of such space-like existents as lines, planes, and solids) may be thought of as related to one another by virtue of their positioning within the whole they constitute. If a line is divided into two parts at point A, say, these two parts (the two rays or, in the case of a determinately extended line, the two line-segments) may be thought to constitute the line by virtue of their relative positioning within the line (for example, by virtue of each comprising one half of the line as this extends in each direction from point A).

Our example of a line and its two rays or segments provides an excellent analog to static or space-like time. We need only suppose that point A in our example corresponds to the now—or, perhaps, the present now. Aristotle, however, insists that time cannot be thought to be constituted of its parts (of past and future) in this manner. In particular, he explains [*Cat.* 5a27–30]:

> for, since neither of the parts of time abide [or, stay fixed: *hypomenei*], how could they have any sort of relative positioning with respect to one another? It would be more appropriate to suppose instead that they have a relative ordering (*taxis*) wherein one part of time exists prior to what exists subsequently.

Aristotle's account of time in Book IV of *Physics* likewise indicated that the parts of time do not abide, or stay fixed, in particular insofar as the now continuously demarcates past and future. In a way, accordingly, past existence and future existence are constantly changing—and so too are the relative positioning of existents which are past and existents which are future. Indeed, sometimes the latter even become the former.

Interestingly, though, the examples of temporal predicates or categorial terms (*legomena*) Aristotle first mentions in *Categories* concern the past. The two *legomena* he mentions to introduce time as a category are 'yesterday' and 'last year' [*Cat.* 2a2]. Presumably, Aristotle could have included such examples as 'tomorrow' and 'next year', and even 'today' and 'this year'. One wonders, then, why he selected just 'yesterday' and 'last year'.

One hypothesis is that Aristotle supposes that real temporal existence consists of what (and only what) has in reality existed or occurred up to the current now. The future does not in reality exist. Neither does today or this year (the present is not even a part of time) except, on this hypothesis, insofar as today or this year have a past part. On this hypothesis, then, Aristotle selects unambiguously past-time predicates or terms inasmuch as his categories assay ways in which we think and talk about real existence, and past-time constitutes time's real part.

Another hypothesis, however, is that Aristotle's choice of examples of temporal *legomena* relates to his later concern for emphasizing the difference between spatial parts and their relative-positioning relationship, and temporal parts and their only-sequential relationships. Perhaps, in other words, Aristotle wishes to emphasize that—howsoever one chooses to think about the future or future-time *legomena*—we must first and foremost recognize that (even) past existents differ fundamentally in ontological character and status from spatial or space-like existents.

In particular, while spatial or space-like existents concurrently exist (or, concurrently have real existence), temporal existents do not; and this difference pertains as much to past existents as we might more readily suppose already regarding future existents. In this regard, too, it may be significant that Aristotle's choice here to mention only past-time *legomena* comports well with what his *On Memory and Recollection* has to say about memory's fundamental role in temporal cognition.

Parmenides' intent in his *Way of Truth* was to demonstrate that in reality the natural universe is non-temporal, unmoving, and does not consist in any diversity, plurality, or differences whatsoever. It is in reality an internally homogeneous and perfect sphere. Zeno's attempts to demonstrate the unreality of motion seek to support Parmenides' Eleaticism, though by focusing on this key aspect of Parmenides' vision.

Aristotle introduces and responds to four arguments attributed to Zeno of Elea: the Bisection argument, the Achilles argument, the Traveling Arrow argument, and the Stadium argument. The last of these (the Stadium argument) and Aristotle's response to it do not add significantly to understanding Aristotle's account of motion and its relationship with time. The Achilles argument is worth some consideration here because it emphasizes a key feature of Zeno's Eleaticism—its insistence on the primacy of reason over sense-experience for cognition of real existence, of the real nature of the natural universe.

Aristotle provides only an extremely terse summary of the Achilles argument. He summarizes Zeno's argument as alleging that [VI. 239b15–18]:

> even the slowest runner could never be caught by the fastest runner. For, before this could happen, the pursuer must reach the location whence the pursued began running—hence, the slowest runner must always stay somewhat ahead.

What Aristotle is not explicitly telling us in this highly compact summary is that the argument proposes a scenario in which the slowest human runner (say, Mike) is allowed a staggered starting location ahead of the fastest human runner (Achilles). With this in mind, the gist of the argument is something like this:

No matter how fast Achilles is and no matter how slow Mike is, Achilles could never catch Mike. For, before Achilles catches Mike, he first must reach the location whence Mike was allowed to start the race ahead of Achilles. But, no matter how quickly Achilles reaches that location, Mike will have run at least some distance beyond it. Accordingly, before Achilles can catch Mike, he must reach the location Mike reached while Achilles was reaching Mike's starting location. But, no matter how small a distance that may be—Mike is, after all, very very slow—and no matter how quickly Achilles reaches it, Mike will have run at least some distance still farther. Accordingly, although each time Achilles reaches a location vacated by Mike he comes closer to catching Mike, he can never in fact catch Mike.

Aristotle's response to the Achilles argument seems entirely irrelevant, a complete *non sequitor*. Aristotle responds simply that the argument rests on the same principles as the Bisection argument—*sans* the bisecting procedure itself—and so his response to the Bisection argument constitutes a response to the Achilles argument as well [see IV.239b17–25]. Of course, I have not discussed the Bisection argument yet. Still, Aristotle's strategy here seems to be to reformulate the problem from being one in which Achilles must catch Mike to one in which Achilles simply needs to run his own race—which, since he is *ex hypothesi* much faster than Mike, would have him presumedly catching and indeed passing Mike somewhere along the way. Aristotle, though, therefore does not respond to the actual Achilles argument at all.

My reason for discussing the Achilles argument here is the insight it provides into Zeno's overall approach in denying the reality of motion.

Zeno intends to show that our usual way of thinking about motion is fundamentally flawed—indeed, that reason can logically demonstrate inconsistencies or impossibilities in our usual thinking about motion, especially as this derives from our sensory perceptions of motion and moving things.

Zeno does not deny that, if you and I were sitting in the stadium observing Mike's pitiable attempt to outrace the gracious Achilles, we would see Achilles running much faster than Mike and readily passing him on his way to the finish line. Zeno's Eleatic claim is that these goings on in the *world of (sensory) appearances* could not reflect what goes on in the *world of real existence*—wherein, he intends to demonstrate, nothing in fact "goes on" at all. In the Achilles case, our sensory experiences in watching Achilles embarrass Mike cannot reflect reality because reason demonstrates that what you and I observe is in fact impossible, and the world of real existence cannot include anything which is impossible.

We may, of course, seek to validate our contention that Achilles appears to pass Mike and win the race, for instance, by using a temporal measurement device. If, for example, Achilles ran one-hundred meters in 10 seconds and Mike ran sixty meters in 30 seconds, then surely Achilles must have passed Mike and won the race. After all, he reached the finish line before Mike—indeed, 20 seconds before Mike—despite Mike's forty-meters head start. But this result would be irrelevant to Zeno. Temporal measurements pertaining to the observable (apparent) Achilles and Mike and their running motions simply do not pertain to the real Achilles and the real Mike—that is, to real existence *tout courte*.

Aristotle, in contrast, seems to take the fact that we can observe Achilles catching and passing Mike as justification for simply ignoring the impossibility Zeno alleges concerning that aspect of the scenario, and so for supposing that he need only consider Zeno's prior argument (his Bisection argument) against the reality of Achilles' own purported running of the race at all. Unfortunately, we shall see regarding the Bisection argument as well that Aristotle in effect just insists on what must be the case because we observe it to be so, even while Zeno is insisting that it cannot (in reality) be the case because reason can demonstrate it to be impossible, or rationally absurd.

Before turning to Zeno's Bisection argument, however, the Traveling Arrow argument is worth some consideration because of the further insight it provides into Zeno's Eleatic approach. In particular, it sug-

gests the sort of account of motion which Zeno seemingly would allow as consistent with the uncompromisingly rational character of real existence. In so doing, moreover, it in particular suggests that a genuinely *dynamic* account of motion as it relates to time is indeed required by any successful response to his arguments.

Aristotle summarizes the Traveling Arrow argument, and his response to it, as follows [VI.239b5–9]:

> If everything is at rest whenever it occupies a space [or a volume of space] equal to itself and if what endures motion is always doing so at a given now, then the traveling arrow cannot be moving. This, however, is false. For, time is not constituted of indivisible (*adiaireton*) nows, just as neither are any other magnitudes [constituted of indivisibles].

Aristotle objects to the Traveling Arrow argument, then, that it supposedly requires us to consider a purportedly moving object (the arrow) to occupy a volume of space *at a given now*.

Aristotle holds that this supposition requires us to think of the time it purportedly takes the arrow to travel to its target as constituted entirely of nows, at any and every one of which the arrow is at rest rather than in motion. But, although Aristotle has indeed argued in Book IV that the now is not a constitutive part of time (hence, time cannot be constituted of nows), he also insisted that there is nevertheless sense or meaning to thinking of things existing *at the now* (for example, insofar as the now designates what exists at a given time). Accordingly, Aristotle's response to Zeno's argument again seems irrelevant, another *non sequitor*.

Aristotle in fact begins Book VI by contending that "anything continuous cannot be constituted from indivisibles—for example, a line from points" [VI.231a24f.]. Aristotle gives several reasons for this contention. Their gists, however, all rest on the fact that an indivisible cannot itself have any parts.

Not only can an indivisible not be itself constituted of any further parts but, since it does not itself have any magnitude nor dimension, it also cannot be thought of as having the "relative positioning" sorts of parts mentioned in *Categories*—for example, two sides or extremities, since it has no magnitude which could have extremities or even just "sides." Accordingly, there is no way to compose a continuous magnitude from indivisibles by having them somehow touching or linking up with one another; and insofar as we try to have them relate to one another in their indivisible entireties, this is tantamount to collapsing them all into a single indivisible.

The alternative would be somehow to relate indivisibles to one another in such a way that we leave some sort of separations or "gaps" between them; but any such separation or gap would then need to be bridged by some magnitude, and so be somehow constituted of additional (indeed innumerably many additional) indivisibles. Otherwise, they would not be continuous magnitudes but discrete magnitudes. But, they must be continuous rather than discrete, inasmuch as "what lies between points is always a line and what lies between nows is always time" [VI.231b9f.].

Aristotle adds a corollary which will be crucial, for example, in his response to the Bisection argument. He in effect claims that thinking of continuous magnitudes as somehow constituted of indivisibles has it backwards. The correct way to think of continuous magnitudes is rather to think of them as continually divisible into lesser magnitudes which themselves are in turn also continually divisible without end: "every continuous magnitude must be divisible into what is forever (*aiei*) again divisible" [VI.231b16].

No matter how much (or often) we divide a continuous magnitude, in other words, we always arrive at another continuous magnitude (or, a "divided" pair of continuous magnitudes) which may therefore also be divided, and so on *infinitum*. Accordingly, we never arrive at any sort of minutest possible magnitude, much less something which itself has no magnitude whatsoever (an indivisible).

But, why must the Traveling Arrow argument be thought to suppose that the time it purportedly takes the arrow to fly to its target is somehow constituted of indivisible nows? To be sure, we do not have an independent statement of the argument from Zeno himself. Perhaps Zeno did state it in such a way that it did suppose this. We do not know.

One sort of conception of motion, however, which Aristotle's response to the Traveling Arrow argument ignores is so-called cinematographic motion. This sort of motion (as discussed in Chapter 2) would contrast with continuous motion by indeed thinking of motion as discrete rather than continuous. When we watch a film projected onto a screen, what is actually being projected is a series of still pictures, though they are sequentially projected quickly enough that to our sense experience it appears that we are watching continuously moving images or cinematic existents. Might not this also characterize what in reality is "going on" when the arrow appears to be continuously flying towards its target? If 'at a given now' in Zeno's argument means

at a discrete flight-location, then Zeno's conclusion would follow and Aristotle's appeal to indivisible nows would indeed be irrelevant.

On this reading, the Traveling Arrow argument would constitute an interesting complement to Zeno's Bisection argument. The latter clearly is intended to deny the reality of motion if it is conceived to be a continuous phenomenon. The Traveling Arrow argument, then, would point out that motion conceived to be a discrete phenomenon is tantamount also to denying the reality of motion—just as authentic Eleaticism considers static accounts of time as in fact denials of time's real existence.

Aristotle may, however, have anticipated the possibility of someone proposing that motion is in effect cinematographic when he follows his contention that continuous magnitudes cannot be constituted of indivisibles by contending as well that a motion cannot consist in a sequence of "movings" or, as it were, discrete packets of motion (*kinemata*) [VI.232a9].

Aristotle's arguments for this contention are lengthy and complex. Using locomotion as his paradigm, though, the gist of those arguments center around the notion that [VI.231b29–31]:

> what is moving from one place to another cannot concurrently be moving and have already moved with respect to the place to which it is moving—for example, someone walking to Thebes cannot concurrently be walking to Thebes and have already walked to Thebes.

Suppose, for example, that a certain motion consists of three "packets" of motion—AB, BC, and CD. The gist of Aristotle's arguments here seem to center around the fact that each of these packets must both constitute a certain one packet of something's motion but in so doing also constitute its coming to or arriving at the next packet. But, insofar as packet AB also constitutes something's arrival at B (and so at BC), it is no longer the packet of motion AB; and insofar as packet BC also constitutes its arrival at C (and so at CD), it is no longer the packet of motion BC. The supposition that a certain motion consists of packets AB, BC, and CD thus reduces in effect to the supposition that the motion goes from A to B to C to D without ever in reality going from A to B to C to D. Aristotle claims, in other words, that this would be tantamount to supposing it possible "for someone to have already walked without having walked at any time" [VI.232a10].

This rendition of Aristotle's core argument, however, seems to be yet another *non sequitor* inasmuch as something like this seems to be

precisely what cinematographic movement indeed claims that (what we think of as) motion in reality is—a motion which is accomplished without something in fact ever being in motion, or ever in reality moving. Still, it suggests that Aristotle is aware of the notion, and attempts to refute it.

Aristotle's exceedingly cryptic summary of Zeno's Bisection argument states simply: "what is in motion must first reach the half-way mark before it proceeds towards the end-mark (*telos*)" [VI.239b12 f.]. In earlier discussion, Aristotle alleged also that the Bisection argument supposes that "it is not possible to traverse infinities (*apeira*) or to reach each and every item in infinities in a determinate extent [finite amount] of time" [VI.233a22 f.]. It is unclear whether this supposition was an explicit premise in Zeno's argument, or whether Aristotle is alleging that the argument presupposes it.

What does seem clear are two points: First, Aristotle's cryptic summary of the Bisection argument is short-hand for an iterative premise which seeks to assert some sort of infinity, most likely an infinity of bisections or half-way marks. Second, at least one way to interpret the significance of that infinity for challenging the reality of motion is by alleging that it conflicts with the complete motion's time being finite.

The Bisection argument asks us to envision, for example, Achilles running a race—say, the one in which he also passes a slower runner. The one premise Aristotle gives us states that before Achilles could proceed towards the finish line, he would first have to reach the half-way mark between the start line and the finish line. The apparent iteration intended here would next have us recognize that before Achilles could proceed to that half-way mark, he would first have to reach the half-way mark between the start line and the race path's half-way mark. It would then have us recognize a similar point regarding that half-way to the half-way mark, and so on *ad infinitum*. Before Achilles could proceed towards any given such half-way mark, in other words, he would first have to reach a preceding such mark; and this is the case for every such half-way mark since any and every given such half-way mark is some distance or other from the start line—howsoever minute that distance becomes as we continue bisecting the magnitude in this way.

Notice that this does not claim that the distance from Achilles' start line to his finish line is thereby finally bisected into, or reduced to, an infinity of such increasingly minute half-way distances or half-way marks. It is not at all clear, in other words, that the challenge it poses is for us to develop cognitive or mathematical resources which would

allow us to compose or calculate a finite distance or number from such an infinity.

Nevertheless, we have seen that at least one of the ways in which Aristotle interprets the argument does have it supposing that this iterating bisection procedure implies such an infinity, and then arguing that it is impossible to traverse such an infinity or to reach each and every item in it in a finite amount of time. Looked at in this way, the Bisection argument might be articulated as follows:

Bisection Argument I

(1) The magnitude of any given motion may be bisected infinitely into infinite many half-marks or bisect points.
(2) The magnitude of any given motion may be traversed only by traversing this infinity of bisect points.
(3) It is impossible to traverse an infinity (e.g. of spatial bisect points) in a finite amount of time.
(4) The magnitude of any given motion is finite.
(5) A finite magnitude must be traversable in some finite amount of time.
(6) Therefore, it is impossible to traverse the magnitude of any given motion.
(7) Motion always consists in traversing a certain sort of magnitude (e.g. a certain distance in the case of locomotion).
(8) Therefore, motion is impossible.
(9) What is impossible cannot have real existence, or be real.
(10) Therefore, motion cannot be real.

Aristotle's best-known response to the Bisection argument is directed against something like this version of the argument. In particular, Aristotle may be thought to deny premise (3)'s claim that it is impossible to traverse an infinity in a finite amount of time. Aristotle prefaces his response by claiming that [VI.233a14–17]:

> a thing traverses half a motion's magnitude in half the time and in fact it traverse any given lesser magnitude in a correspondingly lesser time; for, the same divisions shall pertain to the time as pertain to the magnitude.

Building on this claim, Aristotle subsequently argues directly against premise (3) that [VI.233a24–28]:

> there are two senses in which length and time—and in general anything continuous—may be said to be infinite: either with respect to their divisibility or with respect to their extremities. Accordingly, although it is impossible to reach items which are infinite by virtue of something's [infinite] quantity in a determinate extent of time, it is possible to do so when they are infinite by virtue of something's divisibility—since time is itself infinite in this same sense.

Indeed, Aristotle adds later, the finite time in which premise (5) requires a motion's magnitude to be traversable "will be divisible into an equal number of divisions as [or corresponding to] the magnitude" [VI.233b6f.].

At first blush, Aristotle's response here seems irrelevant, yet another *non sequitor*. The Bisection argument never denies that time is also infinitely divisible—for example, alongside or concurrently with a motion's infinitely divided magnitude. Premise (3) asserts quite simply that it is impossible to traverse this magnitude's infinity of bisect points in a finite amount of time. The fact, let us suppose, that a finite amount of time is itself also infinitely divisible in like or corresponding fashion is just irrelevant. Presumably Aristotle's idea here is that, just as these infinite divisions of some finite time thus match up with the infinite divisions of the motion's magnitude, so too does the finite amount of time thus match up with the original (finite) magnitude. But, premise (5)'s challenge is for Aristotle to show that it is therefore possible to traverse or reach this infinity of division-marks in the motion's magnitude in that finite amount of time.

Aristotle's response to the Bisection argument may in fact be more pertinent to a slightly altered rendition of the argument. Ironically, this possible version of the original argument attempts to highlight the argument's requirement that this infinity must somehow be traversed or reached if motion is to have real existence.

Michael White, for example, credits Aristotle with "finding a deeper question underlying the [Bisection] paradox: whether it is possible to complete an infinite number of acts" [White (1992), 170]. By 'a deeper meaning' here, White means a more subtle or sophisticated understanding of the Bisection argument than one which supposes it just to allege that we cannot compose or calculate finitudes from infinities. Our first version of the argument, of course, already supposes that there is more to the argument than that. By 'an infinite number of acts', however, White has in mind that the intended focus of the bisection procedure is on the acts of moving which something must perform if

it is to traverse or reach the infinity of half-way marks or bisect points generated in premise (1) of our first version.

This alternate version thus underscores the irrelevance of mathematical solutions to Zeno's actual argument. It may be articulated as follows:

Bisection Argument II

(1) The magnitude of any given motion may be bisected infinitely into infinite many half-marks or bisect points.
(2) Therefore, in order for something to proceed on towards the end-terminus of its motion, it must reach infinitely many such bisect points.
(3) Reaching this infinitely many bisect points requires infinitely many motions—one motion for each bisect point to be reached, or by which each is reached.
(4) Therefore, in order for something to proceed on towards the end-terminus of its motion, it must perform infinitely many motions.
(5) It is not possible to perform infinitely many motions in a finite amount of time.
(6) The magnitude of any given motion is finite.
(7) A finite magnitude must be traversable in a finite amount of time.
(8) Therefore, it is not possible to perform the infinitely many motions required to traverse the magnitude of any given motion.
(9) Motion always consists in traversing a certain sort of magnitude.
(10) Therefore, motion is impossible (and so necessarily unreal).

Thought of as a response to something like this version of the argument, Aristotle's insistence on the infinite divisibility of time may again be interpreted as in particular directed against premise (5). This time, however, it seems more apropos.

In particular, if we keep in mind Aristotle's previous claim that something "in fact traverses any given lesser magnitude in a correspondingly lesser time," it then seems that Aristotle's key idea here is that as the half-marks generated by the bisection procedure become nearer and nearer to the motion's start-terminus the amount of time it takes to reach them becomes correspondingly shorter and shorter; and time's correspondent and concurrent divisibility along with the magni-

tude insures that these shorter and shorter amounts of time are indeed always available (for example, to Achilles).

Premise (5), in other words, oversimplifies the issue. It ignores the fact that the motions comprising this infinity do not each take an equal amount of time to perform but in fact take increasingly shorter and shorter amounts of time to perform. Indeed, insofar at it supposes that as the distance from the motion's start-terminus to the most recently bisected half-mark become indefinitely small (approaches infinite tinyness) as the bisection procedure approaches infinitely many iterations, so too does the amount of time it would take to reach that half-mark become indefinitely short (approaches infinite brevity).

Conversely, then, insofar as the Bisection argument presupposes that this infinitely many bisect points are points or "marks" made in the motion's original finite magnitude, so too may these infinitely many amounts of time be thought of as increasingly shorter and shorter amounts of some original finite time—in particular, just the finite amount of time it takes someone to perform the given finite motion.

Yet, something still seems lacking in this response to Zeno's argument. Despite Aristotle's allegation that the argument presupposes something like premise (3) in version I or premise (5) in version II, even Aristotle's own cryptic summary of the Bisection argument seems primarily concerned with whether something could proceed towards the end-mark or -terminus of its purported motion. It is not at all clear, in other words, that the argument is concerned at all with whether this could be done in a finite amount of time. Rather, it seems primarily concerning with whether this could be done at all.

Viewed this way, the point of the bisection procedure's being thought of as unending or infinitely iterable does not seem to be that it thereby generates infinitely many half-marks. If that were its point, one might wonder why this would not indeed amount to supposing that its continuous magnitude may ultimately be reduced to indivisibles—and so be ruled out already by Aristotle's earlier arguments against anything being constituted of indivisibles.

As for Aristotle's own apparent implication that, as the half-mark which something must reach before it can proceed with its motion becomes infinitely near to its start-terminus, so too would the time available for it to reach that mark become infinitely short, Aristotle himself has already maintained that every such time must be some determinate extent (finite amount) of time which is again divisible. There cannot be an infinitely short amount of time for him any more

than there can be an infinitely long amount of time. Rather, every time is infinitely *divisible*. Its divisibility is unending. Aristotle's magnitude of corresponding time, accordingly, is subject to the same unendingness, the same infinite regress, as the original magnitude of distance. How seating time in the same Eleatic boat as space saves either of them is opaque at best.

Accordingly, the point of the bisection procedure's being infinitely iterable seems rather to be that in fact the bisection procedure *never arrives at a "first" half-mark* at all; and so it never arrives at a half-mark which would allow something to proceed with its motion once it reaches that mark. The upshot of the argument, in other words, seems to be that *motion cannot even commence*. It is not about what can or cannot be accomplished in a finite time, whether something finite can or cannot be constituted of some sort of infinity.

If Achilles cannot even commence running his race, whether he could traverse its magnitude and reach the finish line in a finite amount of time were he to commence running the race is irrelevant. This way of looking at the Bisection argument may be articulated as follows:

Bisection Argument III

(1) The magnitude of any given motion may be bisected infinitely in that its bisecting is unending.
(2) If bisecting the magnitude of any given motion is unending, then there is no first half-mark nearest to the start-terminus of the motion.
(3) If there is no first half-mark nearest to the start terminus of the motion, then there is no half-mark which is previous to every other half-mark.
(4) Therefore, there is no half-mark which is previous to every other half-mark.
(5) Something can proceed towards the end-terminus of its motion only if it can reach the half-way mark of its magnitude and, indeed, it can proceed towards the half-way mark or any given half-mark before it only if it can reach the previous half-mark.
(6) It is impossible to reach a half-mark which does not exist.
(7) Therefore, it is impossible for something to proceed towards the end-terminus of its motion or even to proceed towards the half-

way mark or towards any of the half-marks before that half-way mark.
(8) Something which cannot proceed towards any half-mark of a given motion's magnitude cannot move.
(9) Therefore, nothing can move.
(10) If nothing can move, then motion is impossible.
(11) Therefore, motion is impossible (and so necessarily unreal).

Aristotle does not seem to recognize the possibility of something like this third version of the Bisection argument. Certainly, he never responds to its statements or premises. Still, there is reason to think that at least Aristotle does recognize the serious challenge which the Bisection argument poses to thinking of motion as something which indeed proceeds, or whose nature is genuinely dynamic in character.

Aristotle's most explicit and best-known response to Zeno's argument, based on time's concurrent (infinite) divisibility along with a motion's magnitude, is consistent with a static account of motion and of time. Indeed, it seems to portray the time a certain motion takes to reach its end-terminus as just stretched out alongside its magnitude, alongside the distance stretching to the end-terminus from the start-terminus.

Aristotle's frequent use in Book VI of geometric representations and concepts when discussing finite extents of time and their relationship to a motion and its magnitude adds to the space-like impression often conveyed by his arguments and remarks in Book VI. As White observes: "Aristotle's view seems to be that *a* time is an interval of movement that is … limited and bounded both in the prior and in the posterior 'direction'" [White (1992), 78]—that is, by the start-terminus and the end-terminus of the motion itself.

There is, however, still reason to suppose that Aristotle intends for the seemingly dynamic portrayal of time which emerges in Book IV to be integrated into what he says about time and motion in Book VI. For example, though he maintains that time is not constituted of nows, or any sort of indivisibles, he subsequently argues that while the now is indivisible it may be thought of as "inherent" or "existing implicitly" in and indeed throughout time. More precisely, Aristotle argues [VI.233b33–234a13]:

> The now—not the now taken in the sense in which it pertains to difference but taken in what is its primary sense, wherein it pertains to sameness—must be indivisible; and, taken in that sense as well, the

> now exists implicitly (*enuparchein*) in every time. For, the now is a sort of extremity in regards to what has occurred … and also in regards to what is yet to occur … It is, we have said, a terminus regarding both ways in which time exists …
>
> Surely, the now which is an extremity in regards to each of these two sorts of time must be the same inasmuch as, if it were different, the one [future-time] could not sequentially follow the other [past-time] because nothing continuous may be composed from things which have no parts [of indivisibles] and because, if each of these sorts of time were separated from the other, what would then exist in between them would still be time…
>
> Moreover, if the now were divisible, then something of what has occurred would exist in what is yet to occur and something of what is yet to occur would exist in what has occurred.

Presumably, the notion that the now "exists implicitly in every time" is Aristotle's way of associating the now with time's infinite divisibility.

Whenever we bisect or otherwise "divide" time, in other words, we do so at or with respect to a now; and we can do this anywhere or anywhen throughout time or any given stretch of time. In this way, at least, the now exists implicitly everywhere or everywhen throughout time or any given stretch of time. Aristotle insists, though, that any now whereat or with respect to which we divide time is always the now. In particular, *it is always the now which* he argued in Book IV *demarcates past and future*. It is always the now which demarcates what has already occurred and what is yet to occur.

Even then, however, the now is not a real existent or itself a real part of the time which it both divides and unites. Otherwise, it would itself have to occupy or be a certain extent of time which then itself must be divisible with respect to itself; and so it would itself have to consist partly of what has already occurred and partly of what is yet to occur. But, in that case, it would not be the now. It would not be what terminates past and future, as opposed to something which consists of past and future.

Arguably, Aristotle's argument here concerning the now and its implicit existence in every time reminds us that time is constituted entirely and always of what has already existed or occurred and of what is yet to exist or occur. Insofar as we think of time as stretched out alongside a motion's magnitude, what is thusly stretched out is not something whose parts or constituents all exist concurrently. Rather, its parts or constituents are always sequentially ordered in the temporal sense or

manner discussed in Book IV. Since we are here talking about time, moreover, the way in which we must mark or divide it somewhere or somewhen along its extent (if we decide to do so) is by *NOW*—at or with respect to a now which is just the now. In that case, however, what we have done is demarcate what has already occurred and what is yet to occur.

Aristotle labors tremendously in Book VI of *Physics* to respond to Zeno's arguments and to piece together an account of motion and time which may be thought to provide an authentic alternative to Zeno's Eleaticism. In the case of the Achilles argument, however, apart from Aristotle's bald assertion that it reduces to the Bisection argument, his only response seems to be a matter of insisting: Achilles' starting location was behind the starting location of his slower opponent. Achilles finished the race before his opponent did. Therefore, Achilles must have caught and passed him somewhere along the way.

And, Aristotle's response to the Traveling Arrow argument, we have seen, seems to have two main components. First, regarding the argument itself, Aristotle insists that there is no such thing as an indivisible now at which the arrow must in reality be at rest at every given now of its purported flight towards the target. Second, he had earlier tried to rule out an alternative cinematographic-type approach to characterizing the arrow as itself always in reality at rest during its purported flight towards its target.

The first component is bizarre given Aristotle's own views concerning the now, including that any precise or particular temporal designation must indeed always occur by virtue of or with respect to the (indivisible) now. Aristotle's argument for the second component seemed to involve the thesis that any given cinematic packet of motion must somehow include within itself motion towards its own end-terminus or -extremity, which thereby also constitutes the start-terminus or -extremity of the subsequent cinematic packet of motion. Presumably, though, Zeno would simply deny this thesis as itself question-begging.

Why a proponent of cinematographic motion should accept Aristotle's thesis regarding packets of motion, in other words, is not at all clear. Indeed, a main point of cinematographic motion is to deny that motion consists in a real procession towards an (any) end-terminus, or that motion as a real procession towards an (any) end-terminus in reality exists.

Maybe Aristotle wants to know: Then how did it get there? But, the cinematic point is that it did not get there. It was *here*; then it was *here*,

then *here*; and now it is *there*. Aristotle might rejoin: But then cinematographic motion is just a form of Eleaticism. But, of course, from Zeno's perspective, this just is his argument's point in the first place.

Finally, Aristotle's initial and best-known response to the Bisection argument seems either to suppose that magnitudes and stretches of time are in fact constituted of, or reducible to, infinitesmals—and infinitesimals in the sense of (absolute) indivisibles rather than just in the sense of "tremendously-tiny no-further-dividables" (atoms)—in stark contradiction to his own position regarding continuous magnitudes. Or else, it seems to amount to a lame insistence that if there exists a finite stretch of time in which something reaches the end-terminus of its motion, then this finite stretch of time is unendingly divisible along with the motion's magnitude. But, this seems merely to beg the question whether such a finite stretch of time does indeed exist. Moreover, the claim of the Bisection argument seems to be that a motion cannot even commence, not that it could not complete itself (or be completed) in a finite time were it to commence.

Aristotle's secondary or indirect response to the Bisection argument shall, unfortunately, seem very much to be an exercise in question begging as well. Along the way, though, it offers interesting, even if at times bizarre, details regarding Aristotle's account of motion and its relation to time.

More precisely, Aristotle seems also to maintain that since the Bisection argument is being applied for example to a race with *ex hypothesi* Achilles is running and since this race is one which Achilles begins at a certain start-terminus and finishes at a certain end-terminus, it simply must be a race which Achilles indeed began and indeed shall finish. Accordingly, there likewise simply must be a certain finite amount of time which is the amount of time in which Achilles will have ran the race upon his reaching its end-terminus.

Aristotle thus, for example, returns to his remark in Book IV that every motion is from something to something and argues [VI.234b10–16]:

> Since every change is from something to something and since when a thing is at that into which it was changing it is no longer changing, whereas when it and all its parts are at that from which it is changing it is not yet changing … it must be the case that some part of that which is changing is at that from which it is changing and some part of it is at that to which it is changing. For, it is impossible that it is entirely at both or at neither.

Or, as Aristotle more succinctly states the matter again later: "Since every change is from something to something, what has changed must already when it has first changed exist in that into which it has changed" [VI.235b6–8].

Here, Aristotle proposes that what in reality occurs when Achilles runs his race is in fact not Achilles running from a start-terminus to an end-terminus but rather Achilles-running-from-this-start-terminus-to-that-end-terminus. Presumably, though, Zeno could accept this. As version III of the Bisection argument emphasizes, Zeno is not interested in denying that Achilles is *ex hypothesis* running a race which has a certain start-terminus and a certain end-terminus. What he is interested to deny is that Achilles could proceed from the start-terminus to the end-terminus, that in reality Achilles could be performing the motion which the hypothesis supposes him to be performing.

But, Aristotle now in effect agrees with Zeno. Achilles is not "performing" anything. He is not proceeding from the start-terminus to the end-terminus. Rather, he in reality is both at the start-terminus and at the end-terminus—*albeit* in such a way that he is therein partially at the one and partially at the other and not entirely at either nor at both of them.

Aristotle's distinctive formula for characterizing the nature of motion may have a role to play here. We have seen Aristotle maintain in Book IV and again here in Book VI that every motion has a from-which and a to-which, or a start-terminus and an end-terminus. In the case of locomotion, he tends to think of these spatially. The start-terminus of Achilles' race may thus be thought of as just the start-line whence Achilles begins running and its end-terminus may be thought of as just the finish-line whereat Achilles ceases running. These two locations on the race track, however, are not merely locations on the race track but termini of Achilles' running motion only because or insofar as Achilles indeed begins his running motion at the former and ceases it at the latter. The same point applies to the earlier example of Koriscon and his stroll from the gymnasium to the marketplace.

Even in the case of locomotion, accordingly, thinking of the termini of a motion as just certain locations in space is not entirely accurate. In the case of other motions, which for Aristotle includes all manner of motion or change in addition to locomotion, such an entirely spatial way of thinking about their termini is even more figurative and imprecise—for example, a chameleon's change of color from green to

brown, a heartbeat, a car seat's warming in the noonday sun, or someone mentally calculating the days before summer vacation.

Aristotle's well-known formula for characterizing the nature of every sort of motion or change states that motion is "the actualization [or realization, or completion: *entelecheia*] of what is potentially real (*dynamei ontos*), just with respect to this potentiality" [III.201a10f.]. In the chameleon's case, for example, its changing from green to brown is characterized by this formula as a matter of its brownness, which was only potentially real while the chameleon was green, being "actualized" or "realized."

In *Metaphysics*, Aristotle more explicitly associates the distinction here between a potential reality and its actualization with the termini of a motion when he tells us that "everything changes from what is real potentially to what is real actually" [*Metaph.* XII.1069b15f.]. Thus, in a way, our chameleon does not change from green to brown but from being potentially brown to being actually brown—though, of course, because of this change it also is no longer (actually) green.

Ironically, while this way of characterizing the termini of a motion may make better sense of motion and change generally, it seems to muddy the waters in Aristotle's heretofore paradigm sort of motion—locomotion. Is the potential reality to be attributed to Achilles before he runs his race a potentiality for reaching or being at the end-terminus or finish-line of the race, or is it just his potentiality to run? Interestingly, Aristotle's preference here in Book VI of *Physics* is for the former: During the race, our running-Achilles is partially at the start-terminus and partially at the end-terminus of the race; and it is therein that what is potentially real before or at the onset of his running is being actualized. A similar remark would seem applicable to the traveling arrow as it purportedly flies towards the target.

Our current concern is how this way of characterizing the nature of motion might apply to Aristotle's response to Zeno's denial of motion as something which in reality proceeds. One way it might do this is by virtue of the fact that before or at the onset of a motion something is only potentially real whereas after or at the culmination of a motion it is actually real. In between these two termini, accordingly, it is not entirely either. At any given point during the race, accordingly, our running-Achilles is neither entirely still just potentially at the finish-line, nor is he entirely actually at the finish-line. And, as he becomes continuously nearer and nearer to the finish-line from the very onset of the race, he therein is increasingly less potentially at the finish-line and

increasingly more actually at the finish-line—until, when he indeed is at the finish-line itself, he is entirely actually at the finish line. At least in this sense, perhaps, we can thus say that his running motion *proceeds* from its start-terminus to its end-terminus.

There does seem to be additional textual support elsewhere in *Physics*, and also in *Metaphysics*, for this sort of rendering of Aristotle. Aristotle's pertinent claim and surrounding discussion is almost identical in both places. In *Physics*, the claim states that motion "seems to be an indeterminate [or indefinite: *aoriston*] sort of thing, … inasmuch as it belongs neither just among potential realities but nor among just what actually exists; … perhaps motion is an actual existent but one whose actuality is incomplete [or imperfect: *ateles*]" [III.201b24–32; cf. *Metaphysics* XII.1069b15ff.]. Both the significance of this claim and its interpretation, unfortunately, are unclear and highly debatable.

In *Physics*, for example, the surrounding context in which Aristotle states this is ambiguous whether his formula for characterizing motion leads him to infer this and adopt it as indeed his own view, or whether he is saying that the nature of motion might lead others (but not him) to think of it this way. Scholars and commentators have tended, though, to suppose that this is indeed part of Aristotle's own account of motion; but then there is substantial debate over what it means. In what sense is unfinished motion "indefinite" and "incomplete" for Aristotle? He seems to say that motion is indefinite in that it is neither entirely just potentially real nor entirely just actually real, and that it is incomplete insofar as it therefore is not entirely just actually real. But, even if we agree that surely it says this much, it is unclear and debatable what this claims that motion therefore is.

Aristotle's formula, for example, may just be a way of repeating the fact that while something is in motion it is no longer entirely just at its start-terminus, nor is it yet entirely at its end-terminus. The motion itself, in other words, should not be classed either with the potential realities attributable to things before or at the onset of their motions, nor with actual realities attributable to them after or at the culmination of their motions. But, the motion might as such still be a certain sort of (full) actuality—in particular, whatever sort of actuality actual motions actually are. This way of reading Aristotle's claim, however, effectively nullifies my above attempt to apply his characterization of motion in terms of potential reality and actual reality in a manner which would aid him in providing an intelligible response to Zeno.

Another way to read Aristotle's meaning, of course, would be in the manner implicit in my attempt to apply it to Zeno. Even if Aristotle does not intend to claim that motion cannot be thought of as actually real at all, or in any sense whatsoever, he might still indeed be claiming that it is actual at most in a sense which is intermediate between potential reality *simplicter* and actual reality *simpliciter*. Whether a motion's intermediate status between potentiality and actuality might itself admit of gradation—such that, for example, the farther it is from its start-terminus the less potentially real it is and the nearer to its end-terminus it is the more actually real it is—would, of course, be an additional issue. Nevertheless, this reading of Aristotle's claim would support employing it in a response to Zeno.

Perhaps, though, we need also to recall Aristotle's earlier reassertion in Book VI of the now as continuously demarcating past and future. Perhaps motion considered just by itself, and as it relates to or is delineated by its start-terminus and end-terminus, is indeed appropriately or at least possibly thought of as a static sort of existent. Perhaps insofar as we likewise consider time just insofar as it "numbers" motion, or constitutes the determinately extended (finite) amount of time which a motion takes to "proceed" from its start-termini to its end-termini, it is also appropriately or at least possibly thought of as a static and space-like sort of existent.

The key, however, may be that time is not merely this. It also is what continuously consists of what has already existed or occurred and what is yet to exist or occur. Accordingly, howsoever we ultimately characterize the nature and existential character or status of motion as such, what renders it genuinely processional (dynamical) is indeed the genuinely temporal character of its existence. By now, however, it should come as no surprise that matters unfortunately cannot be so simple or straightforward in Aristotle.

To begin, I have been attempting most recently to piece together a way in which Aristotle's discussion of the nature of motion may be applied in responding to Zeno's denial that motion is in reality dynamic in character (and so is itself real). This attempt has not provided Aristotle with a direct response to our third version of the Bisection argument. But it has at least muted some of the force of that argument by indicating that, insofar as a motion can be thought to exist or commence at all, what persists or endures the motion indeed proceeds towards the motion's end-terminus. Perhaps to this extent at least its needing to reach half-marks—including some non-existent first half-

mark—is avoided. Unfortunately, one strand in Aristotle's discussion in fact agrees with the key claim in version III of the Bisection argument that it is impossible for motion to commence, or for something to commence moving in the first place.

Aristotle is concerned with the fact that, on the one hand, so long as something is at the start-terminus of its motion it would seem to be the case that it is not in fact moving whereas insofar it is moving it would seem to be the case that it can no longer be at its start-terminus and, on the other hand, insofar as something is still moving it would seem to be the case that it is not yet at its end-terminus whereas insofar is it is at its end-terminus it would seem to the case that it is no longer moving.

Put differently, there seems to be a tension between thinking of a motion as what occurs in between a certain start-terminus and a certain end-terminus, and thinking of a motion as extending or proceeding from a certain start-terminus to a certain end-terminus. Aristotle attempts to deal with this issue by considering the now insofar as it constitutes or designates, on the one hand, "when" a motion begins or leaves its start-terminus and then, on the other hand, "when" a motion ceases or reaches its end-terminus.

This strand of Aristotle's subsequent discussion begins by addressing the latter *when*—the *when* a motion ceases, where its ceasing is not merely a matter of its being in the late stages of its proceeding towards its end-terminus (its approaching or nearing the end-terminus) but a matter of its indeed halting or "having been completed." Aristotle argues, regarding this *when*, that [VI.235b32–236a5]:

> The *when* in which what has completed a change most properly completed the change must be indivisible (*atomon*) … For, let this *when* be an extent AC which is divisible, and let it be divided by B. If the completing of the change occurs in AB or, alternatively, in BC then AC could not be the *when* in which what has completed a change did so. On the other hand, if it was still changing in both AB and BC (since it must either have changed or be changing in each of them) then it was changing in the entirety AC; but AC was presumed, rather, to pertain to its having completed the change.
>
> The same reasoning would apply if it was changing in one segment and completed the change in the other, since this would require supposing that there is an even more proper *when* [in which the change was completed] than the one presumed to be the most proper *when* [whichever segment is the one in which it was completed]. Therefore, the *when* in which something has completed a change cannot be divisible.

Presumably, the sense in which this *when* is indivisible is analogous to the sense in which the now which demarcates past and future is indivisible. This latter now is indivisible in that it is not itself past nor future, and nor does it contain any real or even implicit parts (which would then have to be either past or future); and yet it terminates both past and future conjointly, and so both divides and unifies time.

In a similar vein, Aristotle seems to be saying here that the *when* in which a motion ceases is both just the end-terminus or -extremity of the motion and also in a way a start-terminus of its having ceased. Thought of in terms of the now which demarcates past and future, perhaps we can think of this *when* as demarcating a past in which the motion was occurring or proceeding towards its end-terminus and a future in which that motion is indeed past (is no longer occurring or proceeding at all).

In its own most proper sense, in other words, a motion's reaching its end-terminus (or ceasing) is not itself a motion, and so it does not take time. Rather, something which has been in motion just no longer is in motion but, indeed, now has been in motion.

A difficulty for this reading of Aristotle's argument, however, concerns the status of a motion's end-terminus—or, Aristotle sometimes terms it, its goal or end (*telos*). We have seen that for Aristotle the sort of motion a particular motion is depends on its end, inasmuch as the potentiality whose actualization constitutes the motion is determined by what actually exists when that potentiality is actualized. The chameleon's turning brown, for example, is an actualization of its potential brownness (rather than any other of its myriad potentialities) because the actuality which the potentiality is thereby "turning into" is actual brownness (and not some other actuality).

Aristotle's argument, however, in effect questions whether a motion's end-terminus is a certain actuality towards which the motion proceeds, or whether its end-terminus is just wherever or whenever the motion happens indeed to cease—or even, perhaps, is just whatever actuality happens to be the actuality which happens to be actual when the motion happens to cease.

In the Achilles case, if the end-terminus of the race he *ex hypothesi* is running is not some designated actuality (for example, the finish line on the race track) which determines what in reality he must be doing, but is just whatever actuality or "end" he happens to have or reach when he ceases running, then the focus clearly shifts back to his running motion itself, and so to Zeno's actual question whether what *ex hypothesi*

is occurring is in reality what is occurring, whether Achilles' *ex hypothesi* running movement can in reality proceed at all.

Aristotle does not himself recognize this as a possible consequence of his argument concerning the indivisibility of *when* a motion ceases, or reaches its end-terminus. Rather, he turns his attention to the start-terminus or onset of a motion to address a possible ambiguity in the notion of something's *completing a change*—or, more simply, of something's *having changed*.

In the chameleon's case, for example, we may say that it has changed when it indeed is (actually) brown, and so is no longer green. But, we may also say that it has changed just as soon as it is no longer (entirely) green, whether or not it is brown yet. In the Achilles case, similarly, we may say that he has run when he indeed is (actually) at the end-terminus of his race. But, we could also say that he has run just as soon as or insofar as he is no longer at the start-terminus of his race, whether or not he has reached its end-terminus yet.

It is surely appropriate, in other words, to say that something has moved or changed just because it is no longer entirely where or what it was. Aristotle does seem to recognize this much. He argues [VI.236a7–17 & 236a26 f.]:

> There are however two senses of the expression '*when* something has most properly completed a change'. It may, on the one hand, refer the change to *when* it most properly was completed (since this is when it becomes true to say that it has completed the change). On the other hand, it may refer the change which it completed to *when* it most properly began thusly to change.
>
> Now, when the most proper *when* is taken to pertain to the end (*telos*) of the change, this *when* may be said to be possible and indeed to exist since it is possible for something to complete its change and there does in fact exist an end for any given change—which has been shown to be indivisible and to pertain to what in reality is the terminus of a given change—whereas, when it is taken to pertain to the onset [or beginning: *archē*] of a given change, it quite simply does not exist since there does not exist an onset of change … For, suppose that this most proper *when* is AD. In this case, however, AD surely cannot be indivisible; otherwise, the nows which implicitly exist within it would all coincide with one another…
>
> It is therefore evident that an onset of change does not exist to be denoted by '*when* something has most properly completed a change'; for, the divisions of AD would be infinite (*apeiros*).

Aristotle thus maintains, on the one hand, that motions do reach their end-terminus and cease (*albeit* in a manner which seems to collapse any

distinction between their ceasing and their having ceased, inasmuch as they cease "at a when" where they concurrently both cease and have ceased); whereas, on the other hand, motions do not depart their start-terminus and in reality begin.

As seen earlier, there is a strand in Aristotle's discussion of time in Book IV of *Physics* (and perhaps also in *On Memory and Recollection*) which posits that we cannot recognize time's existence, or cognitively discern its passing, except insofar as or until it has already passed. Aristotle's current discussion of motion and its relationship to time may go in a similar direction. An end-terminus exists for any given motion; and, when a motion reaches its end-terminus or ceases, we then can recognize that the motion has occurred and may cognitively discern what sort of motion it has been.

Perhaps what moves or changes does in a way still have a start-terminus for Aristotle inasmuch as, in recognizing its end-terminus as an end-terminus of a motion and in cognitively discerning the sort of motion it has been in virtue of that end-terminus, we surely also recognize that what has changed was previously different and maybe even what about it has changed and in what way. The chameleon was actually green—and so only potentially brown—before it turned (actually) brown. Koriscon was actually at the gymnasium—and so only potentially at the market-place—before his stroll to midtown Athens. Still, Aristotle in fact holds that the motion or change as such does not have a start-terminus.

Aristotle's denial of motion's having a beginning, though, does seem a choice on his part. In his preceding argument, for the existence and indivisibility of the *when* when something most properly ceases to move, he does not suppose that his portraying it geometrically as an extent AC entails that it must be infinitely divisible; whereas he does suppose that his portrayal of the *when* when something most properly first moves as a geometric segment AD does immediately entail this. Aristotle provides no discernible explanation for this difference in approach and logic. It just seems that Aristotle thinks it necessary to insure that every motion has a goal or end (*telos*), whereas he (mistakenly) thinks he can make do without motions having beginnings or starts.

Aristotle's best hope for responding to the Bisection argument may be to maintain that a motion cannot in reality be demarcated or divided at all. He might insist that the bisection procedure is only a potential procedure owing to a motion's magnitude being a continuous extent or quantity. But he might deny, in other words, that the proce-

dure generates or yields actual half-marks or bisect points. For, it seems that he could then deny premise (2) of the first version of the argument and the equivalent claim in step (2) of the second version of the argument, and perhaps even the supposition in premise (5) of version III of the Bisection argument.

However, Aristotle not only accepts the Bisection argument's claim that the bisection procedure entails more about the nature of motion and its magnitude that just in effect describing their continuousness; rather, he in fact embraces it. In that context, moreover, Aristotle thinks that his denial of motions having beginnings in fact helps him respond to the argument.

Aristotle states this denial also in positive terms—as saying that in every case "that which is moving must have already moved" [VI. 237a2]—and he argues [VI.237a7–11]:

> a thing will have been moving already during half the time [required for the entire motion] and in general during any part of it whatsoever; for, coinciding with any partition of it there will always exist a time which is delineated by reference to the nows [which terminate the partition]. And so, if every time is divisible and what exists in between the nows is also time, then that which completes a change must in every case have completed infinite changes.

Or, he also argues [VI.237a25–28]:

> Since something will have completed a change in a [definite, finite] time and every time is divisible, in half that time it will have completed another change and in half that half another, and so on infinitely. Accordingly, it must in every case have been already changing previously [and so have completed yet another previous change].

According to Aristotle, in other words, the fact that motions do not have beginnings implies that something which has completed a motion (or any portion of a motion) must have in fact already completed an infinity of motions. However, his only or at least primary reason for supposing that this helps respond to the Bisection argument is because motions do have ends or end-termini, and they somehow derive their own existence from the existence of those ends or end-termini.

Once again, for example, Achilles must have run the race because he finished the race and could not have finished it if he had not run it. Once again as well, though, Zeno still wants to know where this existence of Achilles' end-terminus came from in the first place if not from Achilles having first run the race. For Aristotle to suppose that

Achilles must have run the race because his end-terminus exists and he has reached it is surely question-begging.

Or, Aristotle may be correct in insisting that, for example, if something reaches C, and B was before C, then it must have reached B. But, this is not Zeno's issue; and it in any case presumes that something in fact reaches C.

A good summation of Aristotle's account of motion, accordingly, is White's observation that given "Aristotle's metaphysical position … continuous locomotion is 'something of a mystery'" [White (1992), 113]—though I would add that not only locomotion is a mystery on Aristotle's account.

PART III

PLOTINUS' VITALISTIC PLATONISM AND THE REAL ORIGINS OF TIME

CHAPTER NINE

TEMPORALITY, ETERNALITY, AND PLOTINUS' NEW PLATONISM

Plotinus is typically tagged as the founder of a philosophical tradition known, since the later 19th Century, as *Neoplatonism*. Plotinus, like Aristotle, composed a sustained discussion of time, devoting an entire treatise to the topic. In the treatise, *On Eternity and Time*, Plotinus defends Plato's approach to time (as he understands it) while also critiquing Aristotle's account (as he understands it) and some others.

As the title of the treatise intimates, Plotinus' point of departure is Plato's conceit that time is the moving image of eternity. He does not, however, defend the notion that time is the Heavens (or the system of celestial spheres of motion), nor even alternatively that the Heavens or some native feature thereof is the source or cause of time. In fact, like Aristotle, Plotinus criticizes and rejects this doctrine, or cluster of doctrines.

To be sure, Plato is vague in *Timeaus* about how he intends to relate time to the Heavens when he postulates that the creator (the divine artificer) generated time by forming the Heavens and setting it (or its spheres) in motion. Plotinus does attempt to incorporate this more general Platonic claim into his own account; but he does not seem to take Plato to intend by this to equate time with the celestial spheres, their motions, or the temporal "parts" they engender. A.H. Armstrong implies in his footnotes to his edition and translation of Plotinus' *Enneads* that Plotinus associates the doctrine that time is the Heavens or their motions entirely with Pythagoreans—as, presumably, distinct from Plato and his own direct followers.

The Platonic conceit that time is a moving image of eternity suggests a distinction between time or temporal existence, and something else: eternity, or whatever 'eternity' denotes. Plotinus begins his treatise by asserting that the distinction between eternity and time corresponds to the distinction between what exists eternally (*ton aidion einai*), and what comes-to-be and exists in the natural universe (*to ginomenon kai tode to pan*) [III.7.1,1–4]; and he characterizes their relationship as such that the former may be thought of as the latter's exemplar or paradigm

(*paradeigma*), and the latter may be thought of as a copy or image (*eikonos*) of the former [III.7.1,18].

Plotinus immediately associates what eternally exists also with intelligible reality, or intelligibly real substance (*to noeton ousia*) [III.7.2,2]—which for him contrasts with perceptible reality, or perceptibly real substance (*to aistheton ousia*). Eternity and time—or, more precisely, Plotinus says, the 'common conceptions' or 'general impressions' (*ennoia*) we have of these in our souls [III.7.1,4]—thus correspond to two sorts of reality: one eternal and intelligible; the other temporal and perceptible, and equated with the natural universe.

I shall not explicate this distinction in proper scholarly detail. Plotinus' approach to the nature and reality of time, however, is far more dependent on his larger philosophical system than Aristotle's was. Some remarks on Plotinus' metaphysics are therefore unavoidable, especially of course insofar as it will pertain to his investigation of time.

The simplest way to introduce Plotinus' distinction between intelligible reality and perceptible reality is by their relations to human cognition and its intentional objects. In these terms, intelligible reality is reality which is, or insofar as it is, discernible by our intellectual faculties; whereas, perceptible reality is reality which is, or insofar as it is, discernible by virtue of our (five) sensorial faculties.

These two modes of cognition differ in certain fundamental ways which, from a Platonistic perspective, are thought to pertain to their objects as much as to those cognitive processes themselves—indeed, in a way which pertains to those cognitive processes because of their objects. A common Platonistic example of intellectual cognition, and of how it differs in fundamental character from perceptual cognition, is abstract mathematical reasoning.

Consider, for example, the arithmetic truth that two multiplied by three equals six, or the trigonometric truth that the angles of a right triangle total 180 angular degrees. Today, of course, we would say that the former's truth depends in part on one's numeric "base," and that the latter presupposes certain (Euclidean) axioms. This point aside, a crucial feature of these two truths (a Platonist would claim) is their necessity—where a truth is *necessary* insofar as it could not be otherwise. Two multiplied by three, in other words, could not equal any number other than six. It can only, or it must, equal six—and similarly regarding the result of summing the angular degrees of a right triangle's angles. Consequently, their truth may also be said to be invariant and unchanging.

These sorts of truths, moreover, are thought by the Platonist to pertain to real existence itself. Their contents are thought to be not merely intentional in existential character and status, to be not merely indicative or expressive of the sort of thought one would be entertaining were one to think these truths—for example, that one would then be thinking a thought of the 'two multiplied by three [or, two added to two added to two] equals six' sort, or a thought of the 'the angles of a right triangle total 180 angular degrees' sort. Their intentional contents, rather, are thought by the Platonist to reference real existence—indeed, to reference a certain sort of real existents.

As intimated, perceptual cognition—its sensorial contents and the real existence (and existents) it intentionally references thereby—is posited by the Platonist to differ from intellectual cognition in at least the foregoing regard. Perceptual truth(s) is not invariant and unchanging—in a word, it is not "necessary" in the foregoing sense—and nor is the reality (or, the real existents) we discern by virtue of it.

It is important to recognize that Plotinus' distinction between intelligible reality and perceptible reality is indeed a distinction between two sorts (or modes) of reality. In this regard, Plotinus differs fundamentally from the Eleatics and their intent in relegating time (and motion) to the world of sensory experience and appearances. The Eleatic world of sensory appearances—the "world" indicated or referenced by perception's sensorial contents—does not have real existence. Reality, from the Eleatic perspective, is distinct entirely from appearances, which include the diverse, moving, changing, temporal existents we typically presume populate and constitute the natural universe.

Plotinus does posit that the perceptible realm's reality is "weak" or "diminished" compared to the intelligible realm's. In addition to the fact that a weak or diminished reality is therein still a reality, it is debatable whether Plotinus intends to imply that the perceptible world is therein "less real" than the intelligible world. For a crude analogy, it could plausibly be argued that I am no less a philosopher than Plato, even though I surely am a lesser philosopher than Plato.

Plotinus' notion of the perceptible realm's weak and diminished reality may imply, rather, that certain features characteristic of real existence are present or discernible in a weaker or diminished form in perceptible than in intelligible reality; or that insofar as perceptible reality possesses certain features characteristic of intelligible reality it does so in a weakened or diminished manner; or that perceptible reality itself is in fact a weakening or diminishing of intelligible reality itself, or

a weakened or diminished mode of intelligible reality itself. Arguably, Plotinus' notion connotes all of these things.

Further complicating matters, though, is Plotinus' complex and difficult approach to the reality and nature of matter (*hyle*). Surely, one way in which perceptible reality—in its guise as the natural universe (or *vice versa*)—seems a distinct (sort of) reality from intelligible reality is in virtue of its materiality. Natural existents are material existents; whereas, intelligible existents are as such immaterial. Indeed, Plotinus does talk this way at times (though he often prefers 'corporeal' and 'incorporeal' to 'material' and 'immaterial'). And yet, it is unclear and debatable whether for Plotinus matter is as such real, or adds anything real to putatively material (natural) existents.

Plotinus at times depicts matter as (in its purist form) a sort of receptacle (or mirror) for the reception (or reflection) of copies (or images) of intelligibles. Arguably, though, it is a "receptacle" with no preexisting content, nor even any preexisting form or boundaries; a mirror with no independent reflective "surface" as such. Less metaphorically, Plotinus' "receptacle" of material existence is just the spatiality generated by Soul's causative activity itself; and the mirror, plausibly, is just the "surface" of sensory appearances—that is, the real visibility (perceptibility) of natural (*ergo* spatially extended) existents.

In more technical philosophical terms, 'matter' for Plotinus ultimately designates just the theoretical limit of all division and multiplicity (the principal culprits in, or at least consequent indicators of, real existence's weakening and diminishment), or else it designates the universal logical subject of thought and discourse pertaining to perceptible reality and its denizens, constituents, and phenomena.

We can also think of Plotinus' distinction between intelligibly real substance and perceptibly real substance as Platonisticaly derivative from a more fundamental distinction between the metaphysical causes, sources, or principles of natural existence and natural existence itself. In this regard, moreover, Plotinus maintains that to explicate real existence fully (indeed, even to explain and account fully for the reality just of natural existence as such) we must recognize that intelligible reality (or, what Plotinus sometimes calls just 'Intellect') is itself in a way an intermediate mode of reality.

We saw earlier that Plotinus, at the outset of his treatise *On Eternity and Time*, characterizes the relationship between intelligibly real substances and perceptibly real substances as akin to that between an exemplar or paradigm and a copy or image. That this relationship is,

from a Platonistic perspective, real (that it pertains to real existence) can be illustrated using the above example of mathematical truth(s). That is, it is (necessarily) true not only that two's thrice multiple is six and that the angular degrees of a right triangle's angles total 180; but it also is (necessarily) true that two multiplied by three natural existents will total six natural existents and that, if (or insofar as) a natural existent is triangular, its shape will have three angles whose total angularity is 180 degrees.

Two things which this example cannot account for, however, are why mathematics is the way it is (that is, why its truths are as they are, and are not otherwise); and why a certain group of "two multiplied by three" natural existents exists (that is, why particular natural existents exist which, as a group, comprise two multiplied by three existents) or why a certain natural existent is triangular (that is, why a certain triangular natural existent exists). In more general terms, Plotinus maintains that to explicate real existence fully requires, minimally, explanations also of Intellect's own complexity and of how it does in fact relate to natural existence.

Plotinus' conception of preternatural reality, accordingly, consists of three most fundamental principles of real existence (or, in his Greek, three *hypostases*): the One, Intellect, and Soul. This list-order, moreover, corresponds to an existential and causal ordering in which the One is absolutely first, Intellect comes after the One, and Soul comes after Intellect.

The One, in other words, is Plotinus' absolutely first principle, the most primal source and cause, of all real existence—including the intelligible reality of Intellect and the reality of Soul. Whereas, Intellect's intelligible nature and complexity is derivative from (indeed, derives from) the One, whereupon its causal function extends to all the rest of real existence (including Soul). Indeed, Soul's nature and function then derives from Intellect, and is such that natural existence is the final result of this existential "procession," or declination, begun by or in the One. Consequently, though, natural existence's relationship to the preternatural causes of its reality and nature is decidedly ambiguous or, as it were, amphibious.

On the one hand, the natural universe is a distinct mode (or "realm") of real existence from the hypostases as such. The natural universe is the temporal universe. It is the universe of motion and change, and of coming-to-be and perishing. It is the universe of particular material (corporeal) existents (trees, planets, muscats, and so forth). The

(three-fold) order of its preternatural hypostatic principles and causes, however, is none of these things.

On the other hand, the natural universe, in regards to its real existence, is indeed just a final ("lowest") level in Plotinus' complete assay of real existence as it derives, ultimately, from the primal reality of the One. Inasmuch as the natural universe is also the perceptible universe, accordingly, perceptibly real existents are in fact also intelligibly real. They are real objects not only for sensory cognition but also for intellectual cognition.

Viewed from below, as it were, something may exist in Plotinus' world just insofar as (and so long as) it is one. Nothing exists which is not one. Indeed, nothing can exist unless it therein is one. To be sure, to exist is to be an existent; and to be an existent is to be one existent. Plotinus' thinking, though, goes deeper, is more sophisticated, than just this obvious point.

Plotinus, rather, considers the existential integrity of an existent to depend on its unification, on the integrity of its particular unity. An existent horse is not merely therein one (existent) horse. Rather, its existence (and continuance) depends on the proper unification (or unity) of its parts and features as constitutive of a (real) horse. Even such non-substantial existents as armies and faculty committees depend for their (mode of) existence, insofar as (and for so long as) they are thought to be in some sense real, on a proper unification of their members or constituents.

Additionally, nothing exists in Plotinus' world that is not a certain sort of real existent, which is not a real existent of a certain sort; and the sort of real existent something is in fact conditions the sort of unification (or, the unity) proper to it (or *vice versa*). For instance, a horse, in being a different sort of existent from a sequoia tree, requires and exhibits a different sort of unity of (different sorts of) parts than a sequoia tree (and *vice versa*).

Further, an existent horse is not merely one existent, and one existent by virtue of its unity (indicative of the One's causality). Nor is it one existent horse merely by virtue of its being an existent of the horse kind (indicative of Intellect's causality). Nor is it a horsekind-existent merely by virtue of having or being the sort of constitutive unity proper to horsekind (indicative of Intellect's and the One's relationship). Rather, all of these ontic facts apply to it as a moving and changing flesh and blood, and cognitive- and seeing-eyes-endowed, natural existent who was birthed and shall die.

Soul is the ontic principle which causatively accounts for all such distinctive features of natural existents. It is the fundamentally real (hypostatic) cause of every natural existent's indeed being a natural existent—for example, of Bessy being a particular natural existent of the horse kind, a unitary natural existent having the sort of constitutive unity proper to (perceptible) horsekind.

How most perspicuously to articulate the ontic difference yet causal relatedness between Intellect and the One, between Intellect and its intelligibles, and between Intellect and Soul, are major topics in a number of Plotinus' treatises—and of debate among Plotinus scholars. Two features of Plotinus' preternatural order of hypostatic causes and their causality, though, seem especially pertinent to Plotinus' account of time. First, in this ontically hierarchic order, Soul is the proximate cause of natural existence. Second, the "coming forth," descent, or procession of real existence constitutive of this preternaturally causative order is not a temporal process. Accordingly, insofar as Soul most properly or proximately generates and effects natural existence as such, it does so timelessly. It does not, for example, "take time" in doing so.

In general, no temporal distinctions or conceptions properly apply prior to or apart from natural existence as such, including to Soul as its proximate existential cause. Temporal distinctions or conceptions may, for Plotinus, be applied to Soul at most indirectly—that is, insofar as they are used to denote aspects of Soul's causality directly pertinent to the temporal aspects or temporality of natural existents.

Returning now to the text of Plotinus' treatise, *On Eternity and Time*, we find that it structurally divides into three main phases. Its opening chapter, I have noted, alludes to our having a certain "common notion" or "general impression" of eternity, and likewise one of time, and explicitly associates the former with intelligibly real substance and the latter with coming-to-be and the natural universe. His subsequent three-phase discussion proceeds on this basis:

First, in chapters 2–6, Plotinus discusses eternity and in particular what about intelligibly real substance renders it most properly the denotation of our general impression or common conception of eternity. Next, in chapters 7–10, Plotinus critiques classical accounts of time which explicate it in terms either of its relationship to motion, or else as a certain number (*arithmos*) or measure (*metron*). Finally, in chapters 11–13, Plotinus articulates his own account of time, particularly with respect to its causal roots in and relationship to Soul as the proximate source of natural existence.

Plotinus' account of eternity in phase I focuses on features of his intermediate, second hypostasis: Intellect. The two most pertinent features of Intellect in this regard are the sense in which Intellect is both a unity and a multiplicity, and the sense in which it in no way lacks real existence and never loses nor expends any of its real existence.

Intellect's unity-in-multiplicity may be characterized in several different (*albeit* related) ways for Plotinus. At least one sense in which Plotinus' Intellect is a multiplicity, however, is rooted in the Platonic doctrine that there exists a multiplicity of Forms—crudely, of invariant and unchanging paradigms or ontic prototypes in virtue of which the sorts of natural existents there are *are* what, or as, they are. Concordantly, Intellect is not a single intelligibly real substance but (analogously to Plato's realm of the Forms) a multiplicity of intelligibly real substances.

One way in which Plotinus characterizes Intellect in this regard in the treatise is in terms of the Aristotelian notion of a substrate or underlying subject (*to hypokeimenon*) [III.7.5,17]. In these terms, Intellect is a unity inasmuch as all intelligibly real substances have a single substrate (Intellect as such), whereas it is a multiplicity inasmuch as it is therein one and the same substrate with respect to each in a multiplicity of intelligibly real substances.

A second way Plotinus characterizes Intellect's unity-in-multiplicity in the treatise posits that, although Intellect (unlike the One) is not a unity in the strictest sense—in utterly lacking difference and multiplicity in every meaningful sense whatsoever—it also (unlike perceptible, corporeal things) is not merely a *unified whole* by virtue of having been concatenated or constituted from parts: "This authentically real whole [Intellect] has not been assembled from parts but rather itself generates those parts" [III.7.4,10f.].

The intelligibly real substances (or intelligibles) may be thought of as in a way parts of Intellect—for example, inasmuch as they do not exist outside of or apart from it. And so, Intellect may be thought of as a certain sort of whole, inasmuch as parts are always parts of something and intelligibly real substances could not be parts of anything other than Intellect itself. Intellect, however, is not therein a whole in a manner akin to a ship which has been assembled from various fasteners and pieces of wood, nor even in a manner akin to a human body as an assemblage of organs and organic materials.

A nail or a board has a prior existence to becoming part of a ship; and it can always be removed from the ship and resume its own separate existence. Whereas intelligibles are entirely generated by

Intellect. To be sure, a kidney or a collarbone, in contrast, may not have a prior existence to the human body which in a sense has generated it; but it does acquire a kind of existence of its own within that body. It acquires an (admittedly tenuous) identity of its own, distinct from the other bodily parts and organs from which it may be surgically separated. Whereas, intelligibles do not and cannot exist at all outside of or apart from Intellect.

Intellect is as such the intelligibles' only substrate; and one and the same Intellect is equally and entirely the substrate of each and every one of them. In this capacity, Plotinus sometimes characterizes Intellect as intelligible matter, as the matter of intelligibles. Or, as Plotinus says of the inherently real existents (*enuparchonta*) associated with Intellect, "they all are from its substance and together with its substance" [III.7.4, 5 f.].

At times, 'intelligible matter' for Plotinus does not denote just Intellect-as-substrate but, rather, the Dyad—that is, insofar as he conceives Intellect's generation of the intelligibles as to be itself a sort of ongoing procession wherein the intelligibles are generated with increasing multiplicity (or, wherein intelligible substance "declines" into increasing multiplicity) and wherein this procession occurs "by twos" (that is, by division, dyadically).

Plotinus further maintains that the sense in which Intellect is a unity-in-multiplicity implies that it in no way lacks real existence, and nor (even given its function as generating intelligibles, perhaps even in its own "declining" hierarchic manner) can it ever lose nor expend any of its real existence—in a phrase, that it is never nor in any way deficient (*medeni elleipein*) [III.7.4,15].

Again, there are (at least) two levels, modes, or sorts of real existence: the real existence of perceptibly real substances and the real existence of intelligibly real substances. One way to understand Plotinus' thesis that Intellect in no way lacks real existence is to recognize that the former sort of real existence (perceptible) proceeds or derives from, or is "weak" or "deficient" form of, the latter (the intelligible); and, of course, Intellect as such can in no way lack this latter sort. Insofar as Intellect's own motion is understood as a declination towards increasing multiplicity with respect to its generation of intelligibles themselves, never does it therein transition to a "weak" or "deficient" form of intelligibility, or of intelligibly real substance.

Another way to understand this thesis would be to recognize that perceptibly real existence is in fact a sort of real existence just insofar as it is also intelligibly real and, again, Intellect can in no way lacks the latter.

Finally, yet another way to understand this thesis would be to postulate that something in no way lacks real existence when it in no way lacks the sort of real existence which pertains to the sort of real existent it is. But, in fact, Intellect in no way lacks "most truly" or "most authentically" real existence, inasmuch as intelligibly real existence is most truly or authentically real and Intellect in no way lacks intelligibly real existence. Indeed, it is the source and substrate of all intelligibly real existence.

In what way, though, does Intellect in no way ever lose nor expend its real existence? One way in which Intellect may never expend itself (*meden analiskein autes*) [III.7.5,26] may be that, insofar as Intellect is a source or paradigm-cause of another real existent (or sort of real existence), its own reality is not at all diminished by virtue of that causative activity or function. In the eternity phase of his treatise, however, Plotinus seems more interested in remaining focused on Intellect itself and how its own real existence contrasts with that of temporal existents, rather than with whatever causative role it may play with respect to temporal (or any other) existents.

In this regard, it may be tempting to suppose that Plotinus relates eternity most especially to Intellect because Intellect generates its own contents, parts, or constituents eternally—in other words, because it is eternally one and the same substrate for all intelligibly real substance(s). Plotinus is indeed making this point. But, the nature of Intellect and intelligibly real substance is being appealed to here to explicate eternity—in particular, to explicate what our common impression of eternity properly denotes. For Plotinus to be saying in effect just that the nature of Intellect and intelligibly real substance explicates eternity because it is eternal would be circular.

One way Plotinus seems to handle this difficulty in this first phase of his treatise is by discussing ways in which our general impression of eternity, as it might properly denote Intellect, would differ from our general impression of time if we attempt relating it to Intellect, or thinking of Intellect in terms of it. Plotinus thus seems in part to propose (or perhaps presume) that, whatever else our general impression of eternity may connote, it surely connotes *not-time* or *timelessness* and also *not*-certain other common notions whose sense rather presupposes or depends on our general impression of time—for example, coming-to-be and perishing, (natural) motion and change, past and future, (temporally) before and after, and the like.

Intellect generates all of the intelligibly real substances. It is therefore

appropriate to attribute a sort of activity or motion (*kinesis*) to Intellect. In mundane terms, this generative activity is more akin to (though it still differs from) the way in which an organic whole (a human body, for example) generates its own internal parts than to the way in which various boards and fasteners go into constructing a ship. At least partly for this sort of reason, Plotinus associates Intellect's activity or motion most closely with the sorts of processes that occur in living organisms. Indeed, he prefers to characterize Intellect's generative activity as a sort of living and Intellect as therein having a paradigmatic or archetypal sort of life.

Plotinus invokes the list of "highest Forms" or "greatest kinds" (*megista genera*) Plato discusses, for example, in his *Sophist* [e.g. 254D ff.] in the first explication of eternity he posits in the treatise. He states, regarding Intellect and its organic unity-in-multiplicity [Armstrong: III.7.3, 8–18]:

> And when one looks closely at this manifold power, then according as one sees it as a subject, a kind of substrate (*hypokeimenon*), one calls it 'substance'; then one calls it 'motion', according as one sees it as life; then 'rest' in so far as it is always in every way unchangingly itself; 'the other' [i.e. 'different': *thateron*] and 'the same' in that these (different) realities are all together one (*homou hen*). So, too, one puts it all together (*syntheis*) again into one, so as to be only life, compressing the otherness in these intelligible realities, and seeing the unceasingness and self-identity of their activity, and that it is never other and is not a thinking or life that goes from one thing to another but is always the selfsame without extension or interval [indivisibly (*adiastatos*)]; seeing all this one sees eternity in seeing a life which abides in the same, and always has the all present (*paron*) to it, not now this, and then again that, but all things at once [concurrently (*hama*)].

Here, Intellect's eternality is discernible especially in the ceaselessness and self-identity of every intelligibly real substances' activity—"the unending self-sameness of their actuality" (*tes energeias to apauston kai to tauton*)—together with the fact that Intellect's motion or life is such that they do not relate to it as "now this one and then another" (*nun tode authis d'heteron*), but rather as "all concurrently" (*hama ta panta*).

In the remainder of chapter 3, Plotinus synthesizes these two aspects of Intellect's eternality by relating its own changlessness (*me metaballontos*) and that of its unendingly self-same contents to our "common notions" of past and future. He in particular characterizes Intellect's real existence as "always in the present (*ontos en toi paronti aei*) in the sense that nothing of it has passed away, nor yet is anything about it still to come,

but the very thing which it *is* is its reality" [III.7.3, 21 f.]; and he proceeds to argue [Armstrong: III.7.3, 28–36]:

> Nor again will it be [subsequently (*hysteron*)] what it is not already. For there is nothing starting from which it [shall have proceeded until now (*eis to nun hexei*)], for that could be nothing else but what it is [already]. Nor is it going to be what it does not now contain in itself. Necessarily there will be no 'was' about it, for what is there that was for it and has passed away? Nor any 'will be', for what will be for it? So there remains for it only to be in its being just what it is. That, then, which was not, and will not be, but *is* only, which has being which is static by not changing to the 'will be', nor ever having changed, this is eternity.

For Plotinus, as for Aristotle, where there is no past and no future—no *was* and no *will be*, no *is no longer* and no *is not yet*—there is no temporality. Eternity is not a peculiar sort of time—for example, a sort of time which *per impossible* lacks past and future. Rather, eternity is existence which is entirely atemporal or timeless.

When Plotinus characterizes Intellect's reality as always in the present, accordingly, he is not using 'the present' to denote some sort of time or a certain part of time. Rather, he is harking back to his earlier characterization of Intellect's contents as all concurrently present to (or in) it.

Aristotle, recall from Chapter 7, uses 'the present' most properly to denote the totality of concurrent existents insofar as they (or at least some one of them) may be present to someone's sense experience and related temporal cognition, and not to denote some sort of time, nor a certain part nor constituent of time. Plotinus seems to continue this strand in Aristotle's treatment, with the addition of ascribing a similar sort of present-ness also to the intelligible objects of Intellect's own activity or "life."

In Intellect's case, however, the totality (of concurrent) existents which may be present to its intellectual activity is in fact just the totality of all intelligibles whatsoever (inasmuch as there are no intelligibles which are not concurrent with one another), and without this intelligible presentness having any relation to any sort of temporal awareness on Intellect's part.

Perhaps more pertinent here, though, is the degree to which past and future are entwined for Plotinus with motion and change. For something to have changed, there must be something which it *is* but *was not* and something which it *was* but *is no longer*; and for something to change there must be something which it *is not* but *will be* and something which

it *is* but *will be no longer*. Since such notions are inapplicable to Intellect, moreover, any such notions as its *having proceeded from something until now*—or, *until it became what it now is*—are inapplicable as well. Consequently, in these terms, Intellect's existence may be said to be static or 'to stand still' (*hestos echon to einai*) instead.

In the remainder of his discussion of eternity in the first phase of his treatise, Plotinus emphasizes more the significance of futurity (or, Intellect's the lack of futurity) to the distinction and difference between eternity and time. Regarding the previous notion that Intellect's reality is never nor in any way deficient, Plotinus adds that "nor is there anything which is *going to be* for it; for, if something were going to be for it, it lacked it previously" [III.7.4, 16]. Accordingly, Plotinus argues [Armstrong: III.7.4, 18–21]:

> Now with things which have come to be (*genetois*), if you take away the 'will be' what happens is that they immediately cease to exist, as they are [always acquiring anew (*epiktomenois aei*) their existence]; but with things which are not of this kind, if you add to them the 'will be', what happens is that they fall from the seat of being [i.e. Intellect].

Things which have come to be (that is, natural existents) seem to be always looking towards the future inasmuch as their existence is something which they must continually reacquire as they inherently continue moving or changing from what they are toward what they will be. Whereas, existents to which *will be* is inapplicable are not continually reacquiring their existence; and so they are therein also timeless (eternal).

Plotinus' association here of a temporal existent's *will be* with its acquiring existence anew—or, perhaps, acquiring new existence—may suggest that its *will be* cannot, however, account for its current existence. Indeed, something like this notion will be important to Plotinus' critique of Aristotelian motion. But, since a temporal existent's reality cannot instead be explicated entirely in terms just of its *is*, its reality must be explicated at least partly in terms of its origin or source (*arche*). Plotinus claims, for example, that "things which have come to be owe their substantial existence (*he ousia einai*) to their existing from a source from which they came to be" [III.7.4, 24 f.].

Even here, though, Plotinus' focus remains on a temporal existent's continual futurity (*will be*) with respect to an originating source of its existence. For example, he argues that, since the natural universe is the temporal universe and the universe of coming-to-be, [Armstrong: III.7.4, 28–33]:

> the universe, too, must have a future, in moving towards which it 'will be' in this way. This is why it, too, hastens towards what is going to be, and does not want to stand still, as it draws being to itself in doing one thing after another and moving in a circle in a sort of aspiration to substance. So we have found, incidentally, the cause of the [circular] movement of the universe, which hastens in this way to everlasting existence by means of what is going to be.

Conversely, Plotinus focuses in chapter 5 on the previous implication that Intellect does not merely happen not to have changed but rather it can never be (that is, never come-to-be) any way other or different from what it timelessly *is*.

It can never be the case, in other words, that Intellect *will be* different in any way from the way it is: Intellect "has not acquired nor is acquiring nor will acquire anything new"—or, perhaps more precisely, "any additional [so, new] existence" [III.7.5, 14f.]. Consequently, one could never "disperse nor unroll nor prolongate nor stretch It out; and so nor could one distinguish any sort of before or after regarding It" [III.7.6, 16–18]. Whereas, even a natural existent considered to be entirely complete or perfect (*teleios*)—"for example, a certain body which is perfectly conditioned [or befitting] for its soul—is still in need of the future, is still deficient with respect to the time [of its existence]" [III.7.6, 39f.].

Both pastness and futurity are fundamental both to Aristotle's and to Plotinus' thinking about time. I noted when discussing Aristotle (in Chapters 6 and 7), though, that he seems more preoccupied with pastness; whereas, it now seems that Plotinus is more preoccupied with futurity. I have intimated, moreover, that this may have something to do with their respective accounts of motion and of time's relationship to motion—including, in Plotinus' case, in his critique of Aristotelian motion. In this regard, Plotinus' discussion in chapter 16 of the opening treatise in his trilogy *On the Kinds of Being* (*Peri ton Genon tou Ontos*) is especially enlightening.

Aspects of Plotinus' summary of his own account of motion and change in chapters 21–23 of this trilogy's third treatise are also pertinent. This trilogy of treatises, moreover, are listed by Porphyry as having been written immediately prior to Plotinus' discussion of time. Porphyry lists *On Eternity and Time* forty-fifth in order of composition; and he lists *On the Kinds of Being* forty-second, forty-third, and forty-fourth in compositional order.

CHAPTER TEN

PLOTINUS' CRITIQUE OF ARISTOTELIAN MOTION

In the final chapter of his discussion of eternity (chapter 6 of his treatise), Plotinus insists that his conception of eternity be distinguished from the notion just of something's being everlasting or unending. It is especially in this regard that a proper understanding of intelligibly real substance explicates the proper denotation of our common notion of eternity, while thereby also clarifying it. Our common notion of eternity lacks precision, in other words, in not clearly distinguishing eternity from everlastingness; whereas, a proper notion of eternity should.

Plotinus observes that it is difficult for us not to think of eternity in some sort of temporal, or *quasi*-temporal, terms—for example, as something which just can never (at no time) change, or as something which has no past or future but in the sense that it always and forever just *is* (and so never *is not*). His earlier suggestion that we "compress the otherness" betwixt intelligibly real substances into a singular unity and recognize that even their own "unceasing self-sameness" is unextended and indivisible, and his more recent insistence that Intellect cannot be "dispersed nor unrolled nor prolongated nor stretched out," seem in part attempts to develop conceptions which help us circumvent this difficulty.

Nevertheless, it remains tempting (perhaps even to a degee unavoidable) for us to insist that eternity not only is such-and-such but that it always is, even must always be, such-and-such. In particular, Plonus avers, to say that something *always is* means, in its primary sense, something like: "It is not the case that it is real at one time but not real at another time" [III.7.6, 23]. Thinking of eternal existence as something which always is, accordingly, tempts one to imagine its existence as akin to "an ever-increasing expanse, though one which shall never play out at any time" [III.7.6, 26]. Whereas, something which "has no need for the future" (an eternal existent) cannot be measured in any way, whether with respect to some particular (extent of) time nor in virtue of some sort of indefinite and unending time [III.7.6, 38 f.].

It is even misleading (even if somewhat useful) to think of eternal existence as akin to an indivisible point, Plotinus recognizes, or for

example as akin to an indivisible Aristotelian now. To be sure, like a point or an Aristotelian now, eternity's immeasurability may be characterized as an indivisibility of sorts, inasmuch as anything measurable must be divisible (either discretely or continuously) and *vice versa*. Accordingly, Plotinus' earlier insistence that intelligibly real existents are indivisible is partly a way of positing that they are not measurable. Whereas, we tend to think of a point, or an Aristotelian now, as indivisible inasmuch as they are in effect too minute (*albeit* indefinitely, even vanishingly, so) to measure.

As noted in discussing Aristotle in Part II, there are two main senses in which something may be thought of as too minute to measure, as indivisible. Something may be too minute to measure insofar as it exceeds a certain threshold beyond (that is, below) which a more minute measure or measurement is no longer possible. In this sense, *indivisible* may be equivalent to *atomic* (*atomos*). In contemporary science this sort of notion of indivisibles surfaces in discussions of so-called Planck measures.

But, something may also be too minute to measure insofar as, though we may approach ever more closely to measuring it as our measure or measurement becomes more and more minute, no matter how minute our measure or measurement becomes (for example, as we unendingly bisect a magnitude to actualize its non- or vanishing-dimensionality), it still is even more minute than that. This is the sense in which *indivisible* is the same as *strictly indivisible* (*adiaireton*). In contemporary science an equivalent might be the notion of singularities, if such thingies properly speaking do in fact exist.

In this second sense, though, the very notion of minuteness may seem no longer applicable or appropriate. Is something purportedly more minute than every degree of minuteness whatsoever somehow still minute? It may be more appropriate to think of strict indivisibles as immeasurable in that there just is nothing about them to be measured. And yet, we do relate indivisibles to quantities or measures in our conception of them, and do so in the direction of minuteness (as opposed to immenseness, or with respect to any specific quantities). Something like this conundrum may ultimately underlie Aristotle's qualms regarding the real existence of indivisibles. It may also explain partly why Plotinus employs such indivisibles as geometric points, or geometric centers of circles or spheres, in characterizing metaphorically aspects of preternatural reality (for example, the One's relation to all the rest of existence).

The key point now, though, is Plotinus' postulate that, strictly speaking, an eternal existent cannot be thought to be immeasurable even in this strictest of senses. Plotinus proposes, rather, that the tendency in philosophical discourse to associate eternal existence with what is *always real* results from wanting to emphasize the unassailable authenticity or genuineness of its reality. He even proposes that the philosophical term for eternity (*aeion*) derives from the phrase 'always real' (*aei on*), wherein 'always' (*aei*) is shorthand for 'truly.' Thus, 'always real' derives from 'truly real' (i.e. *alethos on*) [III.7.6., 33f.]. But, Plotinus maintains, this attempt to emphasize the genuineness of Intellect's real existence is unnecessary.

Plotinus insists that adding 'authentically' or 'truly' in reference to Intellect's reality says nothing more about it than saying more simply just that it is real. He suggests that it would add something if Intellect's substance—where 'reality' (*to on*) and 'substance' (*ousia*) are in Intellect's case equivalent [III.7.6,28]—contrasted it with some other sort of substance which as such is bogus, or a sort of mere "pretence" at substance (for instance, when we say someone is a *true* philosopher in order to distinguish her from people who pretend to be philosophers but in reality are not philosophers) [III.7.6, 30f.].

For another sort of example, we may call someone a *true* friend to distinguish him from people who portray themselves as a friend, though in reality they are not. In making this point, however, Plotinus' example of the philosopher and this example of a friend imply that someone who is not a true philosopher is not in reality a philosopher (at all) and that someone who is not a true friend is not in reality a friend (at all).

Indeed, this seems precisely Plotinus' point here. We do not need to distinguish authentic or true substance from bogus or pretentious substance because a putatively bogus or pretentious sort of substance is in reality just not a sort of substance at all. Accordingly, the authenticity or true-ness of Intellect's reality does not distinguish it from natural existence, inasmuch as the latter is no bogus reality. Natural existence is also authentically or truly real, inasmuch as it indeed just is real. Temporal reality's status as an image of eternal reality does not connote, for example, that the former is a bogus replica of the latter. Still, Plotinus does wish to distinguish Intellect and its mode of existence from the natural universe and its mode of existence.

We have already seen Plotinus use distinctly dynamical language in this connection. For example, his insistence on eternal existents' lack

of past and future tends to give way to emphasizing their lack of any "need" or "inclination" for the future. Temporal existents do have this "need," in contrast, inasmuch as "if you take away the will be [from them] what happens is that they immediately cease to exist, *as they are always acquiring anew their existence*." Plotinus also has said regarding the universe as a whole that it "hastens towards what is going to be, and does not want to stand still, *as it draws being to itself in doing one thing after another*." Whereas, Intellect can never "acquire anything new." Likewise, Plotinus' assertion that Intellect cannot be "dispersed nor unrolled nor prolongated nor stretched out" suggests that a contrasting sort of existence which is just temporally everlasting (rather than atemporally eternal) may be thought to proceed in these sorts of terms. Perhaps everlastingness differs from eternally real existence, then, insofar as (and precisely because) it pertains to some sort of dynamic existence.

On the other hand, even Plotinus' notion that without their *will be* temporal existents would cease to exist may be parsed as saying in effect that the final time-when when a temporal existent exists is also the time-when when it ceases to exist. Plotinus' related conception that temporal existents are always acquiring their existence anew may, consequently, be parsed as saying in effect that prior to the last time-when when a temporal existent exists there always remains additional times-when when it still exists. Accordingly, temporal existents continually acquire new existence, or acquire their existence anew, in that each time-when when a temporal existent exists is a different (and so "new") time-when which adds to the existence it has already had, or which continues (and so "renews") its existence.

Plotinus' notion that the natural universe as an entirety hastens towards what will be and therein draws being (existence) to itself may thus in effect emphasize the unremitting, unending continuousness of its existence. Accordingly, Plotinus' insistence, too, that Intellect cannot be as such dispersed, unrolled, or the like, distinguishes its eternality from something which is everlasting and never "plays out."

One difficulty to discerning Plotinus' precise intentions here is that he does not seem especially concerned with Eleaticism in his treatise. His allusion to philosophers who suppose that the putative reality of temporal existents is a sham or bogus sort of reality (which in fact is not real at all) may refer to Eleaticism. Plotinus' analogous concern to Aristotle's concern with Eleaticism, though, is rather his concern with Aristotle's (or some very similar) account of motion and change, and how it portrays time and its relationship to motion.

Aristotle's account of motion is Plotinus' main target in chapter 16 of the first of his three treatises on the kinds (or *genera*) of real existents. The wider context of this chapter is a lengthy investigation of Aristotle's categorial theory. Plotinus had just cast suspicion in chapter 15 of the treatise on Aristotle's view that 'producing' or 'making' (*poein*) denotes a distinct category, proposing instead that *producing* (activities and processes which are in some way productive) should belong to a more general category encompassing all *actually real* existents (*energeiai*) [VI.1.15,10ff.]. Plotinus now begins chapter 16 by wondering whether this could also apply to motion—whether motion (*kinesis*) could also be categorized as an actuality (*energeia*)—in particular, given Aristotle's contention that motion is as such something whose real existence is incomplete (*atele*).

This contention arose in Part II (Chapter 8), recall, when discussing Aristotle's response to Zeno's denial of motion's real existence and Aristotle's own characterization of motion as "the actualization of what is potentially real, just with respect to this potentiality" [*Phys* III.201a10f.]. Two aspects of that discussion were especially pertinent to understanding why Aristotle might think that this characterization implies that motion is something incomplete.

On the one hand, Zeno maintains that motion is something which proceeds; and he argues that this dynamic existence we attribute to motion in virtue of how we perceive it is impossible (hence, unreal). Without it, however, motion is unreal. If Aristotle's characterization of motion is to circumvent or respond to Zeno, accordingly, it must itself denote a certain sort of process—a process whereby what initially has potentially real existence comes to have actually real existence. Presumably, though, this process, and the motion which therein *is* the actualization of some potentially real existent, are one and the same. The motion is not something other than the process designated by Aristotle's characterization.

On the other hand, Aristotle's actualization conceit relates to his other main characterization of motion in *Physics* as always *from* something *to* something. Aristotle terms the from-which and to-which of a motion its *extremities* or *termini*—so that every motion has a start-terminus and an end-terminus—and he maintains that every such pair of termini must be termini of something. Something must stretch or lie between them, as it were, or else they would not be distinct but one and the same. In short, termini (or extremities) could not be termini unless there is something for them to be termini *of* or *for*.

This implies, however, that while something is in motion it is no longer at its start-terminus but it also is not yet at its end-terminus—or, at least, it is not "entirely" at either terminus. Rather, it is proceeding from the one to the other. Insofar as something is at a putative start-terminus for some motion, moreover, it is in that respect entirely potential; and when it is at the putative end-terminus for some motion it is in that respect entirely actual.

Consequently, it seems that while something is in motion it is neither (entirely) potential (any longer) nor (entirely) actual (yet) in the pertinent respect. Regarding its motion as such—the process in virtue of which some potentially real existent comes to be actually real in some respect—Aristotle concluded that motion

> seems to be an indeterminate sort of thing, … inasmuch as it belongs neither just among potential realities but nor among just what actually exists; … perhaps motion is an actual existent [surely something which is in motion *actually is* in motion] but one whose actuality is incomplete. [*Physics*, III.201b24–32].

Plotinus evidently understands Aristotle to hold that motion's actuality is incomplete in that it is not completely actuality, in that its actual existence is not a completely-actual existence.

In a way, a motion's actuality is incomplete inasmuch as it is actual just insofar as it is no longer (entirely) potential. Every Aristotelian existent is either potential or actual. Otherwise, it would not be an existent. It would not exist. Accordingly, insofar as something is no longer (entirely) potential, it must (in that respect, and to a corresponding degree) be actual instead. But, insofar as it is not entirely actual, its actual existence cannot strictly speaking be actual either—in which case motion cannot properly be categorized as an actuality.

In the first half (roughly) of chapter 16, Plotinus argues that motion may indeed be characterized as incomplete but that (contrary to Aristotle) a correct understanding of the manner or sense in which motion is incomplete is in fact not incompatible with categorizing it as properly an actuality. One might consider doing this, for instance, by introducing a new dichotomy between two sorts of actually real existence. This, however, would not retain actuality as itself a single category. Rather, it would be tantamount to introducing a new (third) category, *albeit* one having the same name as the one pertaining to Aristotle's original distinction between actuality and potentiality.

Accordingly, Plotinus does not wish to take this route, but instead argues that [VI.1.16, 5–9]:

> incompleteness is ascribed to motion, not because it is in no proper respect an actuality, but because it is entirely an actuality but one which embraces its own completeness recurrently [i.e. 'again and again': *palin kai palin*]—and not in order finally to attain actual existence, which it already has, but in order to bring about something else whose existence is consequent upon its own actual existence, … some state of affairs which it is intent on bringing about.

Plotinus thus rejects Aristotle's thesis that motion "belongs neither just among potential realities but nor among just what actually exists," and maintains instead that it entirely belongs among the latter.

This has important implications for Plotinus' metaphysic of motion. It implies, for example, that *motion itself is never potentially real*. A natural (or perceptible) substance may have a certain potentiality for motion, or a potentiality for a certain (actual) motion. It may be potentially real in a certain respect; and it may subsequently come to be actually real in that respect by virtue of a certain (actual) motion. But, insofar as motion itself exists at all, it actually exists. Or, motion which purportedly exists only potentially is not motion at all.

Motion, accordingly, is not as such "the actualization of what is potentially real (just with respect to this potentiality)"—even though a natural (or perceptible) substance's coming-to-be actually real in a certain respect in which previously it was only potentially real requires the actual occurrence or real existence of a motion which brings about or results in that actuality or state of affairs (*to pragma*).

Motion's purported incompleteness, then, is not a matter of its somehow being less than entirely an actually real existent, or of its belonging to a special category of real existents which are not entirely potentially real but nor entirely actually real. Its purported incompleteness is rather a matter of the sort of (entirely) actual existent it is.

In particular, motion is the sort of actual existent which, *so long as it exists at all, is continuously "recurrent" or "renewing" with respect to its own actuality*. It keeps on occurring, as it were, so long as or insofar as it exists at all; and it keeps on occurring precisely as entirely the actual motion which it in reality actually is—and not just as "partially" or "ever-closer to (entirely) actually" the motion it is. Indeed, we shall see that the ending or cessation of a motion is demarcated for Plotinus just by the absence of a further recurrence of a certain actuality which would have recurred were the motion still existent or occurring rather than ending or ceasing.

Insofar as or so long as Achilles is running, he continues to do so. His

running by its very nature or actual existence begets (further) running, continually renewing itself or "embracing its own actuality." It strives ever onward. When Achilles stops running—when his (actual) running ends or ceases—no further running is begotten. This, however, is not because his running has as such finally arrived at its own complete actuality. Actual running is entirely actual from the onset of its existence, and as (entirely) actually running it necessarilly begets running. When no further running is begotten, this can only be because there no longer is any actual running.

Plotinus' explication of motion's inherent incompleteness thus rejects as well Aristotle's doctrine that the (actually) real existence of motion depends on its end-terminus—or, on the actuality which (as Plotinus prefers to characterize it) a certain motion or moving existent is therein "intent on bringing about." Despite Aristotle's claim at times that the real existence of a motion is "delineated" or "demarcated" by its (pair of) termini, he in fact maintains that the real existence of a motion depends just upon its end-terminus—or, more simply, its end (*telos*). Consequently, for example, Aristotle seems not at all troubled by his own subsequent argument, as seen in Part II, that there is no first or proper *when* when a motion may be said to begin or to have begun because in reality *a motion has no onset or beginning* [*Phys* VI.236a7 ff.].

Aristotle in effect postulates that every motion's having an end, and the end of any given motion's being actually real, is sufficient to explicate its existence. The actually real existence of Achilles-at-the-end-line-of-his-race (whereas previously he was at the start-line of the race) accounts for the (incompletely actual) reality of his running the race; and the actuality of the chameleon's brownness (whereas previously in was green) accounts for the (incompletely actual) reality its color change. The fact that there is no actually real onset or beginning to Achilles' running his race, or to the chameleon's color change, does not impugn the real existence of Achilles' or the chameleon's motion. Or, so Aristotle maintains.

Surely, though, this turns reason on its head. Surely Achilles could not actually be at the end-line of his race when previously he was at the start-line of the race unless he actually—indeed "completely actually"—ran the race. Surely the chameleon could not actually be brown when previously it was green unless it actually—indeed "completely actually"—changed its color.

Surely, in other words, the actuality of Achilles' being at the end-line depends on the actuality of his running (not *vice versa*) and the actuality

of the chameleon's brownness depends on the actuality of its color-changing (not *vice versa*). Surely, too, Achilles could not actually run the race if he never actually begins to run; and the chameleon could not actually change its color if it never actually begins to change color. Surely, in other words, the real existence of a motion more properly depends on its having an actual onset or source (*arche*) than upon its having a certain end (*telos*).

Finally, it also seems surely confused to identify the start-terminus and the end-terminus of Achilles' running just with the start-line and the end-line marked on the race course. Perhaps it is less of a confusion in the chameleon's case to identify the start-terminus and the end-terminus of its color-change with the start-color and end-color of its skin. But, *pace* Aristotle, it is less tempting to suppose that the end-color of the chameleon's skin is actually real at all prior to the chameleon's actually changing to that color. The end-line is actually marked out on Achilles' race course, however, prior to Achilles' actually running to it, and so one can perhaps see why in that case Aristotle might be misled into supposing that the end-terminus of Achilles' running already indeed actually exists if this end-terminus just is the end-line marked on the race course.

Nevertheless, the start-line and the end-line marked on the race course at most demarcate the distance which Achilles must run in order to run the race. Surely, it would be a confusion as well to identify this race-distance with whatever "amount" or "magnitude" one might wish to attribute to the motion itself, and even more so just to presuppose that this latter amount or magnitude depends on that distance. Even if we suppose that Achilles was standing still and not yet running when he was actually at the start-line of the race, his subsequent running might or might not itself terminate at the end-line to the race course.

The end-terminus of Achilles' running may indeed coincide with the end-line marked on the race course. Achilles may, for example, stop running exactly at or on the race course's end-line. But, even then, we can distinguish between Achilles' stopping to run (and so the end-terminus of his running itself and, in that sense, the "how much" he will have run when he stops running) and the location where he stops running (and so the end-terminus of the distance, or the "how far," he will have run when he stops running).

Plotinus' explication of the sense in which motion is an "incomplete actuality" invites us to think of a motion as having or coming to have

a certain distinctive "amount" or "magnitude" which is irreducible to any quantities commonly associated with it—for instance, distance in the case of locomotion, or maybe intensity or hue or tint differential in the case of color change. He thus intimates that a motion is a certain distinct actuality, and that the actually real existence of that motion implies a recurrence of that actuality.

We will consider more carefully later what Plotinus means by characterizing motion as an actuality which recurs "again and again." At the very least, though, we can say on Plotinus' behalf that a motion has or comes to have a certain "amount" or "magnitude" in that, insofar as it actually continues or proceeds to exist or occur, the more of it there is in some distinctive respect. Perhaps we can even say for Plotinus that, whereas a natural substance persists in reality (so long as it exists), a motion renews its reality (so long as it exists). Whereas a persisting natural substance therein remains however "much" it already is, "how much" of a motion there in reality is is a function of how much it renews itself.

Even so, Plotinus insists that motion's again-and-again nature is not a matter of the motion itself becoming more real or actual. He argues against Aristotle that motion does not embrace "its own completeness recurrently … in order finally to attain actual existence." In running his race, for example, Achilles is not (recurrently) running and running and running in an attempt somehow to get his running motion "completely actual"—or, as it were, metaphysically correct—nor in order to pursue some actually real existence which awaits his running somewhere outside and up ahead of it if only he can reach it. Insofar as Achilles runs at all, he is entirely in reality actually running.

As he runs, Achilles may of course pick up speed, and so run faster and faster. We sometimes talk also about someone running strongly or powerfully; and Achilles might indeed run more and more strongly or powerfully as he runs his race. But, to run faster or more powerfully is not to run more actually or real-ly. Metaphysically speaking, slower or a less powerful running is as entirely actual running as faster or more powerful running is.

Plotinus indeed associates motion's recurrent or "again and again" actuality with its having some end distinguishable from the motion itself. This end, however, is not the actuality or real existence of the motion; and nor does the motion's own actuality or real existence depend on the actuality or real existence of that end. Rather, this end is some state of affairs (*to pragma*) which the motion is "intent to

bring about"—an outcome, an effect implicated by the nature of the motion. Consequently, the end's own actuality or real existence must be "consequent upon" (*meta*) the motion itself (and not *vice versa*).

In the debate between Aristotle and Zeno, for example, the end of Achilles' running may in a way indeed be the end-line of the race—or, more precisely, Achilles-being-at-the-end-line-of-the-race. We may say, then, that Achilles is running and running and running because his running is "intent on bringing about" the actuality of Achilles-being-at-the-end-line-of-the-race. More generally, perhaps we can say that any and every case of locomotion recurs, or proceeds again and again, at least partly because locomotion is by nature "intent to bring about" some spatial magnitude or traversed distance. In the Achilles case, this magnitude culminates (terminates) in the race end-line.

Even insofar as the recurrent actuality of a motion may be partly explicated by its "intent" to bring about some end or state of affairs, however, Plotinus remains insistent that the real existence or actuality of the motion itself does not depend on whether it succeeds in its implicit endeavor. Plotinus considers an example of someone walking laps around the stadium; and he argues that the person's walking is (entirely, completely, actually) walking "from its inception" (*ex arches*), such that [VI.1.16, 10–14]:

> if he intended to complete a stadium lap but did not, the deficiency did not exist in his walking—in the walking-motion itself—but [given this intent] in the distance that he walked. For, walking, even for a distance of any given minuteness whatsoever, is still walking and already is [actual] motion.

Here, the motion's "intent" derives from the volition of its source (the walker), from its instrumental purpose as determined by its agent. Plotinus supposes, accordingly, that our walker's walking motion is intent upon bringing about a (complete) lap around the stadium inasmuch as completing a lap around the stadium is the walker's intent in walking around the stadium.

The walker's walking recurs because the walker recurrently walks; and the walker recurrently walks because he is intent upon completing a lap around the stadium. Walking is a sort of (local) motion whose inception or at least performance thus requires a human being (or, more generically, an animal) whose own intent in proceeding to walk may be thought in a way to endow the walking itself with the same intent. Or, perhaps, we can say that such (volitional) motions as walking inherently intend to bring about just whatever end or state of affairs

their human (or other animal) agent might intend in proceeding to move in that way.

Plotinus indeed presumes that all motions require a human or other sort of "intentionally moving" agent; but his example of the lap walker does not entail that, when such an agent does endow a motion with a certain intent (or intended end), she must always intend something as specific as a lap around the stadium, or one-hundred meters, or some such. Surely, a person can commence walking without having a particular destination or distance in mind. Her intent may simply be to walk. Still, walking is in fact always a walking-somewhere. It is a sort of locomotion, and so always a motion from somewhere to somewhere. Accordingly, it seems reasonable to suppose that a walker must implicitly intend at least to walk somewhere-or-other, even if she does not intend to walk anywhere or any distance in particular.

Plotinus thus seems to maintain—or at least to presume for his current purposes—that we may think of motions of any sort as always intending some state of affairs or other. For example, any sort of locomotion undertaken or performed by any sort of natural existent intends to bring about some distance or other—minimally, inasmuch as whenever a locomotion does cease it will have by its nature traversed some distance or other.

It is inherent to any and every sort of natural motion that at least some of the states of affairs whose actuality is consequent upon a motion's own actuality must be *temporal* states of affairs. To be sure, insofar as the natural universe is the temporal universe, every state of affairs which a natural motion might happen to bring about shall in fact be a temporal state of affairs. In addition, though, perhaps every natural motion may also be thought of as bringing about as a consequent state of affairs, for example the time it takes (or has taken) to proceed until its cessation.

Whenever a natural motion ceases, in other words, one of the states-of-affairs it will have brought about shall be some (elapsed period of) time or other; and, so long as the natural motion continues, what that (elapsed period of) time would be becomes larger and larger, or longer and longer. But, on Aristotle's account, the time for example a locomotion takes or lasts is derivative from and dependent on the distance it traverses. Such common notions as 'covering much distance in a short time' and 'covering little distance in a long time,' and in general the notions *fast* and *slow*, are consequently unintelligible on

Aristotle's account. Plotinus, though, would seem to see these as distinct or differently measurable states of affairs.

In the second half (roughly) of chapter 16 of *Ennead* VI.1, Plotinus becomes palpably scornful of Aristotle's account of motion. The precise details and structure of the remainder of chapter 16 is murky. Most of Plotinus' remaining remarks seem to point out various implications of the Aristotelian account, though some seem at least indirectly to reflect his own views.

What is clear, however, is that Plotinus especially targets what he characterizes as the "absurd discussion" wherein Aristotle maintains [VI.1.16, 20–25]:

> Take any segment of motion whatsoever and there does not exist a beginning [of the motion] pertaining to any time during which or after which the motion has proceeded, so that nor is there any [temporal] beginning of the motion itself; rather, since we may always divide it further back towards what previously there was [i.e. before there was motion], it follows that something which has just now commenced moving must have already been moving for an indefinite (*apeirou*) passage of time and so likewise that motion itself must be indefinite (*apeiron*) in regards to any sort of beginning.

Aristotle's own argument for his claim that a beginning of motion or change does not exist in effect argued [cf. *Physics* VI.236a10ff.] that something which begins moving must therein indeed be moving; and that something which is moving must therein already have moved at least somewhat, or must already have accomplished or completed some motion or other. But, according to Aristotle, accomplishing any motion (however little or minute) requires some definite amount of time (call it AD), which therefore must be divisible infinitely (or indefinitely)—for example, by dividing AD into AC and CD, then dividing AC into AB and BC, then dividing AB into ….. *et cetera et cetera*—and so which itself includes or has no first time-when when something could begin moving.

Aristotle did not tell us why A—the start-terminus of AD—could not itself be this first time-when when something begins moving. Perhaps this is already implicit in the preceding argument. In particular, if something which begins moving must therein already have accomplished some motion or other, and if this requires some definite amount of time, then A would in fact itself have to be some definite amount of time rather than a terminus for AD.

Indeed, something like this might be what Plotinus is implying in his above summary of Aristotle's argument when he suggests that in

continually dividing Aristotle's AD we are dividing it "back towards what previously there was"—back towards when motion had not yet begun. For, although A is depicted as the start-terminus for AD—and so in a way for the motion itself—A itself therein demarcates what is subsequently in motion from what previously is not yet in motion. The sense in which it may be thought of as a sort of start-terminus for motion, in other words, must be consistent with its concurrently also being a sort of end-terminus for not-motion, as it were.

It is unclear why Aristotle could not designate the time-when when something which previously was not in motion subsequently is in motion as the time-when when it begins to move, or when motion begins. Indeed, Aristotle himself takes a corresponding approach to the time-when when a motion is completed or ends. Aristotle argues that unlike the former (onset) time-when this latter (culmination) time-when does indeed exist; and he characterizes it as the time-when which demarcates what previously was in motion from what subsequently no longer is in motion.

To be sure, Aristotle's characterization of this time-when as a sort of terminus implies for him that it must be indivisible; and he maintains that indivisibles do not in reality exist. Accordingly, it is unclear in what sense Aristotle could maintain that his argument for the real existence of this latter time-when indeed proves its real existence without contradicting his own doctrines regarding termini and indivisibles. Nevertheless, it seems that Aristotle could have at least attempted to use the same approach he uses when explicating the time-when when a motion ends to explicate the time-when when a motion begins.

Plotinus' subsequent remarks why Aristotle's argument is absurd (*alogia*) propose that the argument is based on Aristotle's "separating the actuality from the motion" and his implicit adoption of two inconsistent doctrines: first, that "the actuality comes-to-be timelessly" and yet, second, that "the motion requires time—and not just some [temporal] duration or other … but in fact a definite quantity" of time [VI.1.16, 26–28]. Aristotle maintains that a motion's actuality resides and awaits it in its end (*telos*). A motion and its actuality are not one and the same thing. Its actuality is something it proceeds towards and finally achieves, reaches, arrives at, or the like, only upon its completion or ending. But, why would this imply for Aristotle that the coming-to-be (*genesis*) of the end or actuality itself is something which happens timelessly (*achronos*)?

Arguably, the end or actuality of a natural motion must be something which comes-to-be because it was not there before. Perhaps Aris-

totle's conflating the end-terminus of Achilles' running with the end-line marked on the race course leads him to suggest otherwise. But, for example, surely a chameleon's brownness did not actually exist previously, before the chameleon changed from green to brown.

If nothing else, though, it is the case even for Aristotle that the end or actuality of a natural motion exists within the temporal universe, within the universe of coming-to-be. In Plotinus' terms, it is not eternal. It does not exist in an eternal reality. Consequently, if it was not there before, but now does exist in the temporal universe of coming-to-be, it must somehow have come-to-be existent there.

And yet, it could not for Aristotle have come-to-be by virtue of the motion itself since it is the motion's actuality. Like begets like. The cause or source of actuality must be an actuality. The real existence of an Aristotelian motion presupposes or depends on the end which is its actuality. Consequently, the motion cannot be the cause or source of the end instead.

In Plotinus' critique, a motion does not for Aristotle bring about its own end but rather a motion's end in a way brings about the motion. But, since the end or actuality of a motion must come-to-be, it is difficult to see what other (temporal) process or cause could be occurring to account for its coming-to-be if not the motion itself. Aristotle is thus forced to suppose that the end or actuality of a motion does resemble an eternal existent in that it must somehow either just be or not to be. It was not there before, but now it is. Consequently, its putative coming-to-be must be or result from some atemporal process which somehow occurs within the natural universe even despite its being atemporal (timeless).

Plotinus may be aware that for Aristotle the end or actuality of a motion is as such a sort of atemporal existent, inasmuch as for Aristotle the end-terminus of a motion demarcates what was or has been moving from what has finished or is no longer moving. Like the now which demarcates past and future in Aristotle's account of time, the actuality which is the end of a motion is an indivisible terminus which is itself a part neither of what in reality existed while the motion was proceeding or occurring nor of what in reality now exists once and thereafter the motion has ended. Of course, this seems to have the embarrassing consequence for Aristotle that it therefore does not in reality exist, or does not have real existence.

Clearly, this patently peculiar existent is not akin to a temporal existent which endures, persists, remains unchanging and "at rest," or

the like, during its existential tenure in the natural universe. Rather, like the Aristotelian now which demarcates past and future, the end which is the actuality of an Aristotelian motion seems in a real sense not to be a part of temporal existence as such. That is, the end-line which is the actuality of an Aristotelian motion comes-to-be without in any obvious sense actually coming to be. It also exists in the temporal universe without itself being a temporal existent of any obvious sort. Perhaps in this way, too, we can see that for Aristotle the end or actuality of a motion comes-to-be timelessly. Howsoever it somehow comes-to-be, it somehow comes-to-be as a timeless existent in an otherwise temporal universe.

In any case, Plotinus maintains that this Aristotelian doctrine or consequence is inconsistent with Aristotle's insistence that the motion of which some end is the actuality must itself be a temporal existent. A motion requires time and, indeed, always some definite quantity of time. That Aristotle maintains this is clear; and, in fact, this doctrine is central to his attempted response to Zeno as well as to his own argument for the nonexistence of any beginning for motion. Presumably, the inconsistency lies in these two doctrines together implying that the actuality of a temporal existent is in reality atemporal.

The real existence of motion is necessarily temporal while, for Aristotle, the actuality which determines or demarcates its real existence is atemporal. Again, though, like engenders like. How could something whose actuality is atemporal be actually temporal? Something whose actuality is atemporal surely must therefore be actually, or in actuality be, itself atemporal.

That this last is not the case for motion might seem possible, or at least not overtly inconsistent, only because Aristotle separates the two—the actuality and the motion. But, as Plotinus has previously argued, this is itself already absurd. When Achilles is running he is actually running. If he were not actually running he would not be running but doing something else—for example, lying down, standing around, stretching, walking over to the refreshment stand, or flirting with Helen.

To be sure, Achilles may then be potentially running; but potentially running is not running. Potentially running is being capable of running even when one is not running. Or, perhaps, potential running is the sort of existence which running has when someone who is capable of running (and maybe also is ready and on the verge of running) is not running but is doing something else. Still, when the race does begin and Achilles does indeed run (and so is actually running) his

actually running and the actuality of his running are not two distinct and separate things.

Achilles' actually running (and so his running) is the actuality of his running; and the actuality of his running is his actually running (and so his running). Consequently, if his running is a temporal existent, the actuality of his running is a temporal existent; and, if the actuality of his running were somehow an atemporal existent, his running would be an atemporal existent.

Recall, however, that Plotinus has also argued that the time which an Aristotelian motion requires to proceed to its end or end-terminus is (as for example the distance traversed by a given locomotion or any given segment of a locomotion) something which is consequent upon (*meta*) the motion as such. Indeed, Plotinus now declares that such definite quantities of time—and presumably any other such consequent state of affairs (*pragma*), for example, the distance traversed by a given locomotion or by a given segment of a locomotion—may be ascribed to the motion as such only accidentally (*kata symbebekos*) [VI.1.16, 29f.].

That the relationship between a motion and its temporal duration is accidental (as opposed, in particular, to being essential) may already be implicit in Plotinus' example of the stadium lap-walker. Just as our walker would have entirely been in actuality walking even if he did not in fact complete an entire lap around the stadium, so too would he have entirely been in actuality walking even if he had intended to walk for an hour but in fact did not complete an entire hour of walking.

This particular way of looking at it, however, does not quite do the job. It is one thing to say that a motion would (entirely) actually be the motion it is even if a certain intended state of affairs is in fact not brought about by the motion; but it is quite another to infer from this that the states of affairs which are in fact brought about by the motion whenever it in fact does end are therefore related to the motion only accidentally.

On the other hand, surely our lap walker's stopping after one-half of an hour instead of walking for the entire hour he had intended to walk does not by itself alter the actuality of his walking as such. If he stopped because he managed to cover the same distance in one-half an hour that he originally intended to cover in an hour, this might imply that the actuality of his walking was itself also different from what he himself had originally intended inasmuch as it would be the actuality of a twice-as-fast walking than the actuality he originally intended. But,

the actuality of his actually walking as such would be just the actuality of however or in whatever manner it is that he is actually walking, regardless of however long he does end up walking—and likewise for however far he ends up walking.

It may be, in other words, that the actuality of any natural motion must be one which proceeds temporally, and so whenever it does end it necessarily will have lasted for some temporal duration or other. But, it also seems that the actuality of any natural motion is such that once it begins it is thereupon and thereafter just whatever actual motion it is regardless of the definite quantity of time which that duration ends up being—including if natural motions have a sort of inherent intent of their own to bring about certain definite states of affairs, including perhaps how long they should naturally last or take. This may partly be why Plotinus insists that natural motion must begin, or have a beginning.

The Aristotelian doctrine Plotinus is challenging claims not merely that motion requires time. It claims that motion requires time "and not just some duration or other … but in fact a definite quantity" of time. It now seems that it is in particular this second part of the doctrine which Plotinus is challenging. To be sure, it may be that motion requires some duration or other. The nature or actuality of any natural motion may indeed entail that it must last for or take some quantity of time or other—perhaps also that it "should" or "is supposed to" last for or take a certain particular quantity of time, and so even that *all things being equal* it necessarily will last for or take that quantity of time. But, if it turns out not to be the case that "all things are equal," but instead conditions and factors external to the motion itself prevent it from proceeding as it should or is supposed to proceed, this does not alter nor impugn the nature or actuality of the motion itself.

Plotinus' insistence, that whatever definite quantity of time is in fact brought about by a given motion—or does in fact exist consequent upon that motion—may be ascribed to the motion as such only accidentally, thus seems meant more directly to challenge the Aristotelian argument denying the existence of an onset or beginning for motion. That argument in effect applied Zeno's bisection argument to denying the real existence of an onset or beginning for motion (even while Aristotle also denied that the bisection argument successfully impugns the real existence of motion itself).

Arguably, insofar as we bisect some quantity which may be ascribed to motion but that quantity is related to the motion itself only acciden-

tally, then even if we successfully demonstrate that the quantity cannot itself have any first or initial part, constituent, phase, or the like, not only would this not impugn the real existence of the motion itself; but it also would not entail that the motion itself could not have its own beginning.

On the other hand, Plotinus does maintain that the (definite quantity of) time when a given motion in fact ends is brought about by and is consequent upon the motion itself. Surely, the beginning of the motion is also the beginning of whatever definite quantity that time turns out to be. Otherwise, Plotinus himself would seem to separate in another way the actuality of motion from the actuality of its temporal existence.

Put differently, even if Plotinus' insistence on the accidental nature of a definite quantity of time's relation to a motion is meant to drive a wedge between the two parts of Aristotle's inference ("it follows [1] that something which has just now commenced moving must have already been moving for an indefinite passage of time and so likewise [2] that motion itself must be indefinite in regards to any sort of beginning"), surely he should still be reticent to accept even just the first part of this inference. Plotinus thus brings chapter 16 to a close by arguing that if Aristotle is willing to accept that the end of motion is timeless, he ought to accept that the beginning of motion may be timeless as well [VI.1.16, 31 ff.].

We have seen Aristotle himself claim that in a way time is indefinite (or infinite), despite supposing when arguing that motion could not have a beginning that if something is (temporally) indefinite then it could not in reality exist. For Aristotle, however, the indefinite or infinite reality of time emerges mainly in the context of natural existence as a whole, or time as a feature of natural existence as such, and hardly or not at all in the context of discussing motion itself or actual and particular existents and motions.

On this issue of a beginning (and ending) of motion, it may be significant that Aristotle's notion of the now does not play a role in Plotinus' critique of Aristotelian motion, nor in his critique of Aristotle's argument denying the real existence of a beginning for motion. Indeed, we shall see that the now hardly comes up at all in Plotinus' own account of time in *On Eternity and Time* as well. Plotinus seems well aware of and conversant with Aristotle's requirement that every definite quantity has two extremities or termini, and with Aristotle's requirement that every natural motion has a start-terminus and an end-terminus. Yet, Aristotle's preoccupation with the indivisible now as the termini of a temporal

quantity, or of a natural motion's temporal existence, is not echoed in Plotinus.

Perhaps, though, Plotinus does not maintain that the termini of definite quantities must themselves be entirely, absolutely definite. Perhaps for Plotinus a terminus which may be definite insofar as it is the definite (or defining) terminus of some definite quantity may itself be, as it were, *fuzzy*—and in that sense indefinite. In these terms, maybe Zeno's and Aristotle's arguments do not demonstrate that a motion cannot begin to proceed, nor that it cannot have a beginning, but rather that a motion's beginning is (temporally) fuzzy.

Pick any time-when when something is in motion, as close as you wish to any time-when when it was not yet in motion, and there may be yet another time-when when it is in motion which is even closer to the time-when when it was not yet in motion. Indeed, Aristotle does claim that any given indivisible and absolutely determinate now we might associate with a motion's putative beginning does have real existence. But, if this were not the case—if instead a motion's onset were a fuzzy-existent, so that this picking-our-nows is an exercise in abstractions and not an identification of real existents—then it would not be at all surprising that Aristotle's now encounters logical difficulties when applied to it. Minimally, if a motion's (temporal) beginning is not a now, then there being no "first now" need not impugn the motion's having a beginning nonetheless. And, unlike Aristotle, Plotinus does not obviously hold that the beginning of a motion is a now.

Some contemporary approaches to Zeno's arguments suggest in effect that we conceive a motion to begin timelessly (all at once, all the sudden, immediately, just *NOW*), whereupon it generates infinities of nows; and that it is these nows which Zeno encounters, for example, as he unendingly bisects any given duration of the motion. But whether such approaches successfully respond to Zeno's actual arguments or in their own way also just beg the actual question of those arguments, there is no evidence that Plotinus is thinking this way when he supposes perhaps that the temporal beginning of a motion is a fuzzy-existent. Just as he objects to Aristotle's argument that the potentially infinite number of potential candidates for the time-when when a motion begins implies that it has no beginning, accordingly, so too would Plotinus presumably object to Aristotle's arguments claiming that insofar as something has moved at all it must have already completed an infinity of motions [see *Phys* VI.237a7–11 & 25–28].

Insofar as the notion of fuzzy existence helps make sense of Plotinus'

approach to the beginning of a motion, it may also apply to his thinking about a motion's end or cessation. Plotinus does not deny that motions have ends. What he rejects is Aristotle's identification of a motion's actuality with its end. Perhaps another way to state this is that, as Plotinus sees it, Aristotle conflates a motion's end (its intended state of affairs) with the motion's ending (its cessation).

Indeed, we have seen Plotinus maintain that a motion brings about certain states of affairs, at least some of which may indeed be in a way "intended" by the motion. And at least some of those "intents" (ends) may even be inherent to the sort of motion a motion is—for example, a heavenly circuit in the case of a planet's locomotion, hot food in the case of cooking, knowledge in the case of learning, a breath of oxygen in the case of respirating. Perhaps more to the current point, though, Plotinus also does not deny that particular motions end (cease)—whether when they indeed have brought about the states of affairs they are "intent" to bring about, or due to some other reason or cause. And, just as Plotinus seems not to conceive a motion's beginning to be an indivisible Aristotelian start-terminus, he likewise may not conceive a motion's end to be an indivisible Aristotelian end-terminus.

One way to see how the end of a motion may be a fuzzy-existent is just to recall what Plotinus has said about the nature of motion. Plotinus has characterized the actuality of a motion as one which "embraces its own completeness recurrently, again and again." Later, we shall see that in his own account of motion Plotinus also characterizes it in terms of a continuous, ongoing "urge" or "impetus." Presumably, these ways of characterizing motion apply to a given motion for so long as it occurs. For them no longer to apply to a given motion, the motion must no longer be occurring. It must have ended. Even if we think of a motion as ending utterly abruptly, accordingly, even then what is thusly ending still has (or is) that urge or impetus to recur again.

Consider Achilles again, and his running a race which has a start-line and end-line. Still, what would it mean even to suppose that he somehow stops running utterly and exactly at the end-line of the race? Supposing the end-line to be a geometric line having no thickness (for example, the geometric edge of a chalk-line marked on the ground) and a device capable somehow of discerning this line and detecting whether an object touches it (or the geometric plane vertical from that line), we then might also suppose that Achilles is still running before he touches that line (or plane) but is no longer running after he touches that line (or plane).

But, what is Achilles' status or condition precisely as he touches the line (or plane)? If he is no longer running, then how does he manage to touch the line? How will he have managed to run all the way to the end-line, unceasingly precisely until he touches the end-line? On the other hand, if Achilles is still running, then how does he manage after touching the line to have had already stopped? How will he have managed to stop at—hence, to no longer be running at—the end-line?

Although Achilles is a mythic figure and a son of Zeus, we are supposing that his running is a real case of actual running. In light of his running motion and corporeal mass, an actual Achilles will build a certain amount of momentum and, even if he begins to slow in anticipation of an attempt to stop running utterly and exactly at the race's end-line, he must retain some amount of momentum and his muscle fibers must still be firing and straining to move his skeletal structure and mass as necessary for him to be running (however slowly he is still running as he attempts his stop-running-exactly-NOW feat), unless he miscalculates and indeed stops running before reaching the end-line.

Arguably, even supposing Achilles capable of discerning the end-line as a geometric line (or plane) and astonishingly capable of stopping-running-exactly-now, precisely when he touches the end-line (precisely how the now at which he stops running relates to the end-line as such) would still be a somewhat fuzzy matter. For instance, even supposing he manages not to slide or stumble or pitch head-first over the end-line, there are still such real world matters as whatever residual processes are occurring precisely then in his musculature and skeletal structure and the residual momentum of his bodily mass with respect to the width-less geometric end-line.

Plotinus, we have seen, would not conflate the end (cessation) of Achilles' running with the end-line marked out on the race course. Arguably, Achilles' running does not as such end at a certain end-line, or end-terminus. It ends in or with his final running motion, in of with the last occurrence of his running motion.

In this regard, moreover, we might think of Achilles' final running motion's urge or impetus to proceed, to embrace its actuality once again, as comparable to (even actualized in) his still-forward inclining muscular and skeletal motions and momentum in the above example. Insofar as we relate the abstract notion of his race's geometric end-line to his actual running—and presuming him indeed to have god-like

stopping powers—Achilles' status precisely as he touches the line (or plane) is that he is performing his final running movement.

Is there ever an utterly, absolutely definite time (or space-location) when (or where) an actual motion in the real world actually ends? There is no reason to think that Plotinus would believe this to be so; and, I think, good reason to think that he would not believe this to be so. Minimally, even in the midst of its final again-and-again occurrence, a ceasing motion finds itself bulging, protruding, reaching, striving, leaning forwards once again towards the continued actuality which, however, this time will not occur.

Insofar as existential fuzziness is inherent to the nature of motion, presumably this applies to a motion's initial occurrence as much as to its final occurrence. When did Achilles begin running? He began running in or with his first running motion, in or with the initial occurrence of his running motion. But, "when" did this occur? Or, more trenchantly, "when" was the onset of his first running motion?

Zeno has demonstrated that there is no absolutely determinate answer to this question. This, however, does not impugn Achilles' actually running his race inasmuch as the onset or beginning of his running consists just in his performing a first running motion—howsoever temporally (and spatially) fuzzy that (like any other) occurrence of a running motion (or, more precisely, of an Achilles-running motion) may be.

Unlike Eleatic or Aristotelian nows, occurrences of Achilles' running motions do not as such admit of infinite regression, or multiplication by virtue of dichotomization. Zeno could not posit, in the context of a temporally (and spatially) fuzzy universe of actual motions by actual bodies, that any given occurrence of Achilles' running motion must have been preceded by a prior running motion. For, in such a universe, there need be no prior running motion to Achilles' first running motion, inasmuch as the onset or beginning of his running is nothing other than his first running motion.

The next time you press and release a key on your computer keyboard, consider exactly when the key began moving downward (depressing) and exactly when the key ceased moving upwards (springing back). Or, press the accelerator pedal on your automobile and release it after a few seconds, and consider exactly when did the automobile began accelerating and exactly when did it stop accelerating. Similarly, exactly when does the cooking element on your stove begin heating when you turn it on, and exactly when does it cease cooling after you turn it off?

Zeno's approach, applied to these contemporary examples, would presume that there must be an exact time-when for the beginnings of each of these motions or changes (and also for their endings, or cessations) which would in fact be so exact that it can only be thought of or designated as an indivisible now; and Aristotle gullibly bought into this presumption. Perhaps, though, Plotinus does not.

Still, Plotinus' approach, arguably, holds that the salient issue does not concern when a motion begins (or ends); but just whether a motion begins (or ends)—which it indeed does just in case there is an unimpeded, sufficient cause of its doing so.

CHAPTER ELEVEN

INDEFINITE TEMPORALITY AND THE MEASURE OF MOTION

Before articulating his own account of time in the third phase of *On Eternity and Time*, in the second phase Plotinus critiques attempts to explicate time in terms just of motion itself and then critiques the notion that time is in some sense number (*arithmos*).

I shall not explore all of Plotinus' many considerations and arguments in detail. At least some of Plotinus' discussion, especially regarding explications of time in terms just of motion itself, raise similar issues and objections to those already encountered in Aristotle's critiques (in Chapter 5). I shall focus, rather, on ways in which Plotinus' critiques reveal his own distinctive approach to the topic, and may anticipate features of his own account of the reality and nature of time.

Plotinus' approach to proposals explicating time just in terms of motion itself resemble Aristotle's, for example, in arguing that time must be distinct from motion as such even though it is nevertheless intimately related to motion in the natural universe. It also argues, however, that the reason time and motion seem so utterly entwined with one another is because motion "proceeds by virtue of time."

We thus saw that in his discussion of eternity Plotinus characterizes the difference between eternal reality and the natural universe as a (spherical) whole, for instance, in terms of the former's never being "real at one time and not real at another time," while the latter moves "in a circle in a sort of aspiration of substance" or real existence. The natural universe unceasingly and unendingly "hastens towards what is going to be, and does not want to stand still, as it draws being to itself in doing one thing after another." Natural existents, unlike eternal existents, require futurity: "if you take away the 'will be' what happens is that they immediately cease to exist, as they are always acquiring anew their existence."

Plotinus' critique of Aristotelian motion comports well with this perspective, indicating that motion is the means or mechanism by virtue of which natural existence pursues and accomplishes this ever-forward self-renewing feat. Plotinus' critique of Aristotelian motion may also

intimate a distinction between time as among the various states of affairs brought about by a motion, and time as inherent to a motion as such as it proceeds so as to embrace recurrently its own actuality.

Presumably, it would be primarily with respect to this latter (inherent) sort of time that motion would proceed by virtue of time. Natural existence thus proceeds and renews itself by virtue of motion, and a motion proceeds by virtue of time as inherent in (but not identical with) the actuality of the motion. On the other hand, presumably it would be with respect to the former (consequent state-of-affairs) sort of time that the notion of time as in some sense number would be pertinent to understanding its nature and reality.

This former sort of time, however, would presumably be (at least partly) derivative from or dependent on the latter sort of time. To be sure, we can temporally measure motions while they are occurring or proceeding, and not just as or when they end. Arguably, though, this involves thinking of the motion as in a way continually ending—for example, as lasting one second (or time-beat), then a second second (or time-beat), then a third, and so on, as one walking-stride gives way to another, and then another, and so on—and so continually bringing about certain temporal states of affairs.

While a motion actually proceeds, however, it does not merely effect just such consequent states of affairs as the increasing amount of time it is lasting or taking to proceed, but each of these hypothetical fuzzy-endings also fuzzily initiate a renewal of the actuality of the motion. Only when the motion attains the (final) end intended by its actuality, or otherwise is induced or caused to cease, does it bring about the final temporal state of affairs which most properly constitutes how long it has lasted or how much time it has taken to proceed.

For Plotinus, moreover, all such temporal states of affairs brought about by a motion as it proceeds are, like this final one, related to the motion and its inherent temporality only accidentally. A motion is as such continuous rather than continual. It renews itself or embraces its actuality "again and again" just by virtue of its being the actual motion it is, just by virtue of its actually proceeding; and it does this (at least in part) by virtue of time. Accordingly, time as inherent to the actuality of a motion would likewise be something continuous rather than discretely continual. Thinking of motion as lasting for or taking certain increments of time is thus doubly an "accidental" way of relating time to motion. To this extent, at least, Aristotle is correct to insist

that Zeno's bisection procedure cannot impugn the real existence of an actual motion, even though Aristotle's own responses fail to recognize correctly why this is so.

Plotinus classifies accounts which attempt to explicate time in terms just of motion itself under three main headings, as making one of three main sorts of claims [III.7.7, 18 f.]:

(i) time is (identical with) motion; or
(ii) time is (identical with) what is therein moved; or else
(iii) time is (identical with) something which pertains to motion.

Plotinus' prefaces his critique of (i), however, by distinguishing it into two possible claims [III.7.7, 22 f.]:

(ia) time is (identical with) the totality of all motions; or else
(ib) time is (identical with) the motion of the totality of (natural) existents.

Plotinus will associate (ii) with (ib), equating time with the sphere of the natural universe (the Heavenly sphere) [III.7.7, 24]; and he prefaces his critique of (iii) by distinguishing it into three possible claims [III.7.7, 24–26]:

(iiia) time is the extension (or, more precisely for locomotion, the distance: *diastema*) which pertains to a given motion; or
(iiib) time is the measure (*metron*) of a given motion; or else
(iiic) time is a certain universal consequence (*holos parakolouthoun*) of motion, either of all motion or at least of all regular motion.

I shall begin with Plotinus' critique of (i)—that is, of (ia) and (ib).

Plotinus begins his critique of (ia) by indicating that for his purposes it does not matter whether we consider the totality of all motions to be a unity (*mian*) constituted of every and all motions whatsoever, or we consider the pertinent totality to be constituted just of all "regular" motions [III.7.8, 1–3]. Plotinus thus seems aware that Aristotle's account of time as it relates to motion is hampered by a severe limitation. In particular, it is limited in scope to regular motions—motions which are such that half the motion would take precisely half the time as the entire motion, one quarter of the motion would take precisely one quarter of the time as the entire motion, and so on.

Plotinus, accordingly, is in effect alerting us that his objections to (ia) do not pertain just to equating time with regular motion. It would be an obvious embarrassment for someone promulgating (ia) if it turned out that (ia) relates time only to regular motion, since this would imply that motions which are not regular are atemporal (though Aristotle seems unaware of this, or else he just ignores it).

Plotinus makes clear his intent is to reject (ia) regardless of the particular motions or sorts of motion it is meant to encompass. Indeed, he immediately cues us on one of his primary concerns regarding (ia). Plotinus argues [III.7.8, 3–6]:

> for, we say that motion of either kind [regular or irregular] exists by virtue of time; whereas, if someone maintains that it does not exist by virtue of time, then motion would be all the more sundered from temporal existence, inasmuch as the reality of that by virtue of which motion exists would exist differently from motion itself.

Plotinus here cues us, in particular, that he will maintain that time's relationship to motion is such that motion exists *by virtue of time*. In this regard, it is pertinent to note that the Greek term '*arche*'—the term translated earlier as denoting something's onset or beginning—may also denote something's source or generative cause; and that Plotinus indeed increasingly uses it this way in his treatise on time. For now, though, the salient point is the constrast between Plotinus' thesis that motion exists by virtue of time and the claim that time just *is* motion.

Plotinus' argues that equating time with motion itself (instead of with that by virtue of which motion exists) renders motion "all the more sundered from temporal existence." An implicit premise here may be that the sort of reality something has (or is) depends on its source or generative cause. If 'time' does not denote the source of a motion's existence, accordingly, this is tantamount to claiming that motion's source is atemporal instead. But, if the source of a motion's existence is atemporal, then so too would motion itself be atemporal—ironically, even though equating time with motion itself may be in part an attempt to insure the temporality of motion.

In other words, if 'time' denotes just and only motion itself, and so not that by virtue of which motion exists or proceeds, then that by virtue of which motion exists or proceeds would not as such be temporal but would "exist differently"—that is, atemporally. But, the sort of reality something has depends on that by virtue of which it exists or occurs; and so the reality of motion would then be atemporal, and not temporal at all.

Plotinus' use of '*arche*' to denote not only something's beginning but also its source may render his consternation at Aristotle's denial that an *arche* of motion exists more trenchant as well. Unless something is an eternal substance, then in order for it to exist it must come-to-be existent; but, in order for something to come-to-be existent, there must exist a source or generative cause of its doing so. Consequently, if there does not exist a source or generative cause of motion, then motion (since it as such is not eternal) could not exist.

Plotinus, however, does not consider the downfall of (ia) to depend on this. It is sufficient, he avers, to recognize (again, whether we consider just regular motion or also irregular, varying, motion) that "a motion may be interrupted, or it may cease altogether, whereas time cannot" (III.7.8, 7–8). If time were identical just with motion itself, then what happens to a given motion happens to time. If a motion is interrupted or it ceases altogether, then time would be interrupted or cease. But, Plotinus evidently maintains, time cannot be interrupted, nor can it cease.

This point also intimates, though, that time resembles motion in that it in some way proceeds. Unlike motion, however, time (necessarily) proceeds unceasingly and unabated; and presumably it does so by virtue of its own nature. It cannot not proceed—or, at least, not so long as the natural universe (or, some natural motion or other) exists at all.

Arguably, Plotinus' pithy objection to (ia) observes that any given motion may be interrupted, even cease altogether, and not that all motion whatsoever may—concurrently, or taken together as one totality—do so. The natural universe is for Plotinus as truly and fundamentally the universe of motion and coming-to-be as it is the temporal universe. The reality of natural existence thus requires both time and motion. While it may seem possible to imagine the universe entirely stopping at least temporarily, there is no evidence that Plotinus entertains this imaginary possibility or, if he did, that he considers it genuinely possible and not merely imaginary.

Still, perhaps motion is genuinely universal and ubiquitous as well. A given motion's being interrupted or ceasing, then, does not entail that all motion is interrupted or ceases even there, or for the moving thing. Arguably, in our universe a natural existent which pauses or ceases to move or change in one respect must still be moving or changing in some other way or respect. Or, any final (or even temporary) ending of a given motion must always coincide with the beginning of another motion. In the natural universe, accordingly, rest is a relative notion;

and it always applies only with respect to some particular sort or manner of motion.

Regarding (ib), Plotinus indicates that philosophers claiming this typically intend 'the motion of the totality of all (natural) existents' to denote the celestial circuit of the Heavens—which indeed does exist or occur unceasingly and unabated. He does not disagree, but proceeds with two principal criticisms [III.7.8, 10–12 & 14–16]:

> [First,] the heavens would not go around completely by virtue of the same time as it would were it to stop half-way around, but the half-circuit motion would be a sort of half-time compared to the full-circuit motion, which would be a sort of double-time compared to it … [Second,] the related claim that the motion of the outermost sphere is the quickest and fastest is further evidence for the argument that time is something different from the motion itself.

This first criticism is as difficult in Plotinus' Greek as I have rendered it in English. The translation attempts to reflect that Plotinus does not seem to be arguing here that, were time identified just with the circular motion of the Heavenly sphere, then it would not complete a full circuit in the same time as it would complete one-half a circuit—or, in other words, that it would not take the same time to go around completely as it would take to go half-way around. This would hardly constitute a criticism. Indeed, it seems obviously true. Insofar as this is indeed a consequence of (ib), accordingly, it would seem to validate rather than criticize it.

Plotinus seems to have in mind here a more subtle way of continuing his previous criticism of (ia). He cannot be talking here about a half-circuit requiring or taking a different amount of time than a full-circuit since this is obvious and unobjectionable. Rather, he must be talking about time itself somehow being different were it identical to two hypothetically different motions—say, a full-circuit motion and a half-circuit motion.

Plotinus does seem to suppose here that, although the Heavenly sphere in fact moves unceasingly and unabated, we indeed can imagine it stopping half-way around—in which case its motion would differ from its motion when it does not do so but instead does go all the way around. But then the time being identified with this half-circuit-motion would be a different time from the time being identified with its full-circuit-motion in cases where it does compete a full-circuit. Evidently, though, what would differ is not time itself but the amount of time for which the Heavenly sphere would have been moving.

One way to explicate Plotinus' first criticism of (ib), in other words, would be to distinguish between something's *being* time and its *taking* time. If the Heavenly circuit has temporal existence, then surely the complete circuit and a semi-section of it may be compared to one another with respect to their temporal existence. But, if 'temporal existence' in this context means that the temporal existent *is* time, then the full-circuit and the semi-circuit would each constitute a distinct time-reality, in which case they could not even be compared to one another with respect to their temporality. Rather, the full-circuit motion which supposedly *is* time would also not be time (insofar as the semi-circuit motion supposedly *is* time) and, likewise, the semi-circuit motion which supposedly *is* time would also not be time (insofar as the full-circuit motion *is* time).

In this context, however, 'temporal existence' should mean rather that the temporal existent *takes* time (to proceed); and it is then reasonable and sensical to compare the two hypothetically different motions to conclude that the full-circuit motion takes double the amount of time the semi-circuit motion takes while the semi-circuit motion takes half the amount of time which the full-circuit motion takes. Time as such is the same for both hypothetically different and distinct motions. Consequently, it cannot just be identical to either or somehow to both of them.

Plotinus' second criticism of (ib) underscores this point that, insofar as two motions differ in regards to their temporal existence, what differs is not time as such but the time they take to proceed. However much sense Plotinus' supposition of two different sorts of Heavenly motions—the one full-circuit sort of motion and the other a half-circuit sort of motion—does or does not make, proponents of (ib) do attribute circular motions to the various Heavenly spheres as these are distinct existents from one another. Moreover, they maintain that the more-outer (and so larger) the circular orbit traversed by a given Heavenly sphere is the quicker (or faster) it must move. The outermost sphere, accordingly, must move the quickest (fastest) of the spheres; and so the actuality of the outermost sphere's motion must be also a different sort of actuality from the actuality of the other spheres' slower motions, despite their resemblance as circular motions.

Again, though, this does not imply that time as such is different, or that there is a different time-reality, for each of the Heavenly spheres. Time as such is the same, or the same reality, for all of the Heavenly spheres—indeed for the entire natural universe.

Plotinus may also have in mind here that, if the claim that time is just identical to the motion of the Heavenly sphere intends that it more precisely is just identical to the motion of the outermost sphere alone, then only the outermost sphere would have temporal existence. The other spheres, for instance, would then not have temporal existence. But in that case, we could not compare the other spheres to the outermost sphere with respect to their temporality to claim that the motions of the other spheres are slower than the motion of the outermost sphere, nor indeed that the motion of the outermost sphere is the fastest of all the Heavenly sphere motions.

Plotinus' critique of (i) thus substantially overlaps Aristotle's corresponding critique of such a doctrine. Plotinus subsequently makes even shorter shrift of (ii) than Aristotle did in his corresponding critique, merely arguing that "if time is not [just identical to] the motion of the Heavenly sphere, then surely it cannot be [identical just to] the sphere itself inasmuch as this was presumed to be time just in regards to its motion" [III.7.8, 20–23].

Plotinus provides three more precise renderings of the claim that time is something which pertains to motion. These are:

(iiia) time is the extension or distance which pertains to a given motion;
(iiib) time is the measure of a given motion; or
(iiic) time is a certain universal consequence of motion as such—either of all motion or at least of all regular motion.

In the remainder of chapter 8 of *On Eternity and Time* Plotinus critiques (iiia) but in ways which at times seem pertinent to (iiic) as well. He then devotes an entire chapter, chapter 9 of his treatise, to (iiib).

Plotinus does return briefly to claim (iiic) in the very brief chapter 10; but he does not provide any new argumentation there. Indeed, he indicates that he has already given sufficient arguments for rejecting claim (iiic).

It seems that, of the three claims, Plotinus considers (iiib) closest to capturing at least part of the reality and nature of time. Indeed, part of his critique of (iiia) and (iiic) suggests that they presuppose (iiib) in the ways they attempt to relate (indeed equate) time with motion.

Plotinus does not attribute (iiib) to Aristotle by name (anymore than he explicitly attributes to Aristotle the account of motion critiqued in chapter 16 of his first treatise on the genera of real existence). Still,

let us for now consider (iiib) to be the Aristotelian account of time—*pace* my insistence in Part II that this widespread practice has fostered an inaccurate and incomplete understanding of Aristotle's account of time.

Plotinus' critique of (iiia) supposes that its notion of a certain extension (*diastema*) pertaining to a motion with which it identifies time must either refer to spatial distance (in Aristotle's paradigm case of motion, locomotion) or else to some other sort of "quantity of motion" which may be attributed to every sort of motion, whether or not it proceeds spatially.

Plotinus' initial criticism of (iiia) continues the implicit point of his second principal criticism of (ib), focusing on the temporal comparability of diverse motions—or, the comparability of diverse motions just with respect to their temporality. He notes [III.7.8, 16–18] that

> the same distance is not traversed by every motion—not even by every regular motion—in the same time; but one motion may be faster or another slower by virtue just of the fact that the faster motion and the slower motion are both subject to measurement with respect to something different from both of them; and, surely, it would be closer to the truth if one were to call this 'time'.

If time were identical just to the distance traversed by a motion, then the temporal existence of any two motions traversing the same distance must be the same (have the same temporal extension). Whereas, different motions may traverse the same distance faster or slower; and 'faster' or 'slower' denote not only distance but also something other than distance by virtue of which motions may differ even if the distance they traverse is the same.

Plotinus' above criticism of (iiia), though, is ambiguous whether its mention of "measurement with respect to something different from both of them" refers to something different from both of the motions or to something different from both of the (equal) distances traversed by the motions. The natural sense of the passage seems to indicate the former; but the passage's context and subject matter would indicate the latter.

The latter reading is also indicated by Plotinus' subsequent supposition that what is "different from both" here is not something different from both of the motions but something which somehow in fact is one of the motions so as to render the other motion "different"—faster or slower—when compared to that motion. Whereas, (iiia) requires that what it is about the chosen paradigm motion which gives it temporal

existence is the particular actual distance it therein traverses; and so Plotinus wonders [III.7.8, 28f.]:

> But then *which* of them is the one whose distance is [identified as being] time—indeed, which among all of the indefinite number of motions there are is to be [the one whose distance is identified as being] time?

On the other hand, Plotinus now adopts the perhaps surprising view that a motion and the distance it traverses are in reality the same thing.

Suppose, for example, we select the motion of the totality of natural existence (or, of the Heavenly sphere) as the motion whose distance is selected and identified as being time. Plotinus argues [III.7.8, 29–34]:

> But if this means the distance traversed by the motion of the totality—if this means just the distance traversed by virtue of the motion itself—then what would this distance be other than just the motion itself? To be sure, there is the particular definite quantity [of distance traversed]. But, the particular definite quantity [of distance traversed] is just what is measured regarding the space that is traversed [by the motion]—inasmuch as the motion must traverse some definite quantity of space and this quantity of space will also be the quantity of the distance. This, however, does not pertain to time but to space.

The latter half of this passage does mitigate the surprise of its initial identification of a motion's distance with the motion itself.

Plotinus seems to distinguish between the distance *being* traversed by a motion from the distance which consequently *is* traversed by the motion. The distance which *is* traversed by a motion is a certain measurable quantity that depends on, or is a function of, the quantity of space which the motion traverses. Consequently, it is not a temporal quantity at all but a spatial quantity. On the other hand, the distance *being* traversed is in a way one and the same as just the actuality of the motion, or its proceeding. It just so happens that in the case of locomotion the sort of extension or quantity of motion engendered by its actuality (by its actually proceeding) admits of spatial measurement, is measurable in spatial terms.

Plotinus thus introduces into his current discussion that the actuality of motion is inherently recurrent or "again and again"; and he argues further [III.7.8, 34–46]:

> Even if a motion proceeds continuously and unceasingly—without interruption or stopping—so that it will therein delineate the distance being traversed concordantly, this delineation is due just to the plenitude (*to polu*) of the motion itself. Indeed, were this [the plenitude of the motion] to appear by itself to someone looking at it, … in such a case *time would*

> *neither appear to his sight nor otherwise present itself to him but just motion 'again and again'* [just the recurring actuality which is the motion] … together with the distance which may be observed concordant with this. And so, insofar as the 'again and again' shall relate to some number—for example, two or three—the distance traversed will be some magnitude … But this [magnitude] does not also provide for our general impression (*ennoia*) of time; rather, the definite quantity [the motion's "number," or the related magnitude] comes-to-be on account of time.

Aristotle, recall, maintains that time is (always, in every case) perceptible. For him, time—or at least the temporality of temporal existents—is in a genuine sense an object for sense experience, though precisely in what way is a source of some consternation. Plotinus, by contrast, seems intent that time or temporal existence as such is not an object for human sense experience.

The temporal universe is the perceptible universe, inasmuch as the temporal universe is the natural universe and the natural universe is the perceptible universe. Thus, for example, Plotinus characterizes natural substances as also perceptible substances. Time as such, however, is not itself an object of human sense experience. We cannot see, hear, taste, feel, or smell time—even "incidentally." Accordingly, Plotinus here implies, nor can we see, hear, taste, feel, or smell the temporality of temporal existents. What we, for example, actually *see* is just the motion itself (its actual proceeding recurrently, again-and-again)—including, in the case of locomotion, its therein proceeding *spatially*.

The actuality of a natural motion, though, is a temporal actuality. Natural motion exists and proceeds temporally—for example, as well as (in the case of locomotion) spatially. In this regard, later in chapter 8 Plotinus makes a remark whose Greek, unfortunately, is ambiguous. He begins the remark by asserting that "the distance [traversed by a motion] is not something external to the motion itself but is due to the motion's not being *athroa*" [III.7.8, 48f.]; and continues by remarking further [III.7.8, 49–52] that

> motion which is not *athroa* is distinguishable from motion which is *athroa* by virtue of time. That is, precisely in what way shall a motion which is not *athroa* differ from a motion which is *athroa*? It shall differ [precisely] as it does by virtue of time, so that the motion which traverses a certain distance and the distance traversed by it are not time itself but exist by virtue of time.

As with many passages in Plotinus' *Enneads*, the Greek translated here is syntactically and semantically ambiguous in several respects. Here,

though, the main concern is the term *athroa*. This term can have two almost polar-opposite meanings. On the one hand, it could connote motion which is *all-at-once*, *once-and-for-all*, or *instantaneous*. On the other hand, it could connote motion which is *continuous* or *ongoing*, indeed even *incessant* or *unceasing*.

Hilary Armstrong's Loeb Classical Library translation opts for the former meaning. Indeed, he even translates the beginning of this passage to say that "the comparison of movement which does not happen all at once with what is all at once [the instantaneous] can only be made in time." This, however, would be a bizarre statement. How can a motion which does not happen all at once (a motion which lasts for or takes some amount of time) be at all compared with a motion which is all at once (a motion which does not last for or take any amount of time whatsoever)—or *vice versa*? But, supposing it somehow could, what would be the point of saying that this comparison "can only be made in time"?

Perhaps what Professor Armstrong intends is that the way in which these two sorts of motion compare to one another (more precisely, though, in fact differ from one another) has to do with time. It is difficult to see, however, what this might mean other than perhaps that instantaneous motions are atemporal whereas motions which are not instantaneous are temporal.

Indeed, a case can be made that Plotinus would in fact endorse this viewpoint. Plotinus accepts that a motion which lasts for or takes time is therein temporal. It therein occurs within the temporal universe. His metaphysics also embraces motion which does not exist or occur within the temporal universe; and it is possible that he considers atemporal sorts of motion to exist or occur in a manner which from our chronocentric perspective may be thought of as instantaneous or "all at once." We thus have seen Plotinus say things quite consistent with this when discussing eternity and our common conception of eternity in the first phase of his treatise.

If this is Plotinus' intent here, though, it is difficult to see how this point is pertinent to his current discussion and, in particular, how it would contribute to his criticism of (iiia). Noting that motions which do not occur all at once (but instead traverse some distance or other) are thereby temporal would, if anything, in fact support (iiia).

Plotinus has just asserted that when we look at a given natural motion we do not see time, or the motion's temporality, as such but only the again-and-again plenitude of the motion itself; nevertheless, this

plenitude proceeds however much it proceeds only by virtue of time. It is more reasonable, then, to understand Plotinus' contrast between motion which is not *athroa* and motion which is *athroa* to distinguish motion which is not ongoing or unceasing (but which nonetheless does proceed for or traverse some definite distance) from motion which (like, for example, the motions of the Heavenly spheres) is ongoing and unceasing. Understood and translated in this way, moreover, this passage continues and reinforces his prior claim that when a motion traverses a certain distance (and so a certain distance is traversed by it) this does not occur apart from time (atemporally) but rather by virtue of time.

Although time should not be equated with the distance (or magnitude) traversed by a motion, the motion would not traverse that or any other distance were it not for time. All natural motions, of every sort, presuppose time and their own (inherent) temporality even though we cannot see nor hear nor taste nor feel nor smell this feature of nature—indeed, even though this feature cannot be just identified with anything we can see or hear or taste or feel or smell regarding natural existents or their motions.

Yet, time as it relates to a motion is surely also not something distinct from the motion. The motion has temporal existence; and its temporal existence surely consists at least partly in something about the actuality or actual procession of that motion. Thus, one motion may proceed faster than another motion, slower than another motion, or presumably neither faster nor slower but synchronously with another motion.

Arguably, what it is about the actuality or actual procession of a motion which seems most pertinent to its temporality is its rate of speed. When Achilles runs at a certain rate of speed, for example, this rate of speed is a feature of the actuality of his running motion itself, or at least is a consequence of that actuality. It is a part or a consequence of that actuality, moreover, by virtue of its particular temporal existence.

The velocity or rate of speed something moves, or which its motion proceeds, is discernible as a relationship or ratio between two different sorts of quantities or amounts. One is temporal—a quantity or amount of time. The other depends on the sort of natural motion being considered. Every natural motion, besides its temporality, has another quantifiable aspect which may differ in character for different sorts of natural motions.

In the case of locomotion, of course, this quantifiable aspect consists in its traversing space—or, more precisely, its proceeding spatially. In

our earlier example of the chameleon, it would be a sort of quantity of color-change. In the case of growth, it might be something like a quantity of size-change, or mass-change. Achilles' running speed might thus be ten meters *per* second. A child's growth rate might be two inches *per* year. For our chameleon's color-change, it might be something like two color-values *per* second.

One feature of the notion that time is universal and ubiquitous is that any two motions will be temporally comparable even when they are otherwise not comparable. The rate at which Achilles runs his race and the rate at which the chameleon changes color(s) may be compared temporally even if spatial distances and color-value differentials are not comparable with one another. At the very least, for example, if Achilles takes ten seconds to run his complete race and the chameleon takes five seconds to complete its color change, we can say that Achilles took twice as long to complete his motion as the chameleon took to complete its motion.

In a way, then, perhaps it makes some sense to think of this other quantifiable feature as dependent on the particular actuality of a motion in a way its temporal existence is not. If Achilles stops running half-way through his race, he thereby also stops traversing (engendering) any additional distance to the distance he has already traversed or engendered; but, he does not thereby stop time. Indeed, as Plotinus had pointed out in criticizing (ia), time continues for him uninterrupted. Additionally, this other feature is what we actually observe regarding the motion itself.

On the other hand, if Achilles stops running half-way through his race, surely time as it pertains specifically to his running motion does also stop. His running is no longer taking time or temporally proceeding anymore than it is any longer "taking space" or spatially proceeding. Insofar as time continues for Achilles uninterrupted, so too in a way does space itself. It is just that Achilles' himself is no longer proceeding (moving) spatially whereas Achilles' himself is still, as it were, proceeding (persisting) temporally.

Perhaps, though, this is just another way of recognizing that time or temporality is not dependent upon the particular motion as, for example, space or distance is. Achilles cannot proceed spatially unless he is performing a motion which is one of the sorts of motions which traverse space or engender spatial-distance. Whereas, so long as Achilles exists at all (and regardless of what he is doing while he exists) he proceeds temporally.

Still, we might, for example, "number" the again-and-again actuality of Achilles' running-motion as proceeding, say, at a rate of fifteen strides *per* second (or beat-count); whereas, it would seem odd to say that it is proceeding, say, at the rate of fifteen strides *per* 10 meters. We would say, rather, that every fifteen strides Achilles traverses ten meters, or that each of Achilles' strides is two-thirds of a meter long. A motion does not in fact 'take space' to proceed; rather, it takes time to proceed, and in so doing it traverses space or delineates spatial magnitudes.

Thus, if Achilles ran (from the onset of his running) at a constant rate of fifteen strides *per* second and each of his running-strides delineates or proceeds two-thirds of a meter, when five seconds have elapsed he will have run fifty meters and completed one-half of an one-hundred meter race. To be sure, it would in this case also be true that when he has run fifty meters or completed one-half of an one-hundred meter race, five seconds will have elapsed. But it would seem odd to say that five seconds have elapsed *because* he has run fifty meters; whereas we would say that he has run fifty meters because five seconds have elapsed.

Although we can measure a (local-)motion with respect both to time and to space, and "number" its again-and-again procession as a ratio of the two, time thus seems in a way more fundamental to the motion's actual procession. Surely, moreover, time's role in this is not something external to the motion itself. We might measure the temporal existence of a motion, or for that matter of a pause or rest, by some external device (for example, a clock of some sort, or by mental counting); but this does not imply that time exists apart from but, for instance, somehow "encloses" nature's motions. Surely, when we measure the temporality of a natural motion, or another sort of natural existent, we are not measuring anything other than the temporal existence of that very motion or existent.

We do not perceive time, or even the temporality of a particular motion. We perceive the motion (for example, Achilles' running); we perceive it recurrently proceeding (for example, Achilles' running and running and running); we even perceive certain quantifiable features or consequences engendered or delineated by a given motion's recurrent procession (for example, Achilles' running a certain spatial distance); but we do not perceive the temporality of its procession or its temporal existence as such. As the foregoing discussion suggests, however, we do seem able to discern this, by measuring or keeping track of its progress in certain purportedly temporal ways.

A given method or device we use for doing this may carve up and represent time in an artificial and perhaps even arbitrary way. Nevertheless, perhaps what we measure when we use purportedly temporal measuring techniques or devices is indeed time in the guise of the temporality of natural existence. Indeed, perhaps there is a legitimate sense in which the methods and devices we use for measuring time use time itself to measure time. Accordingly, as Plotinus now says, "we must now investigate how it is that time is a number—or, better, a measure inasmuch as motion is a continuous sort of existence" [III.7.9, 1–3].

Plotinus' critique of (iiib) is the lengthiest and most intricate of the critiques. Plotinus begins by raising a number of questions which indicate in part that claiming merely that time is a number or measure is too general. As it stands, it tells us what it is that time purportedly is a number or measure of (motion) but it hardly tells us anything about what this is which purportedly numbers or measures motion so that it constitutes time [III.7.9, 11f.].

We can simplify Plotinus' discussion by focusing on three main alternatives he considers for specifying the number or measure with which (iiib) identifies time:

(iiib1) Time is a continuous measure which measures a motion by being "a certain definite quantity; … a certain magnitude, evidently analogous to a line which proceeds alongside the motion" [III.7.9, 17–19].
(iiib2) Time is "the number of the magnitude which accompanies the motion, though not the [aforementioned] magnitude which proceeds alongside the motion" [III.7.9, 44f.].
(iiib3) Time is a number which measures a motion "in accordance with (*kata*) before and after as it proceeds alongside the motion" [III.7.9, 56f.].

This third alternative most closely echoes Aristotle's own assertion that time is "number pertaining to motion in accordance with before and after" [*Phys* IV.219b2]. We shall see, however, that Plotinus does not see it redressing the deficiencies already present in the first two alternatives.

Plotinus has already argued that time cannot be equated just with a motion itself. That was claim (i). In proposing these three alternative formulations of the general claim that time is a measure of motion,

accordingly, Plotinus seems in part to be wondering how time could be a measure (of motion) which however is not identical just to the motion itself. Perhaps this in a way seems required just by the notion of a measure of motion. How could motion measure itself? Or, what would this mean?

What is identical with a motion itself is just that motion itself, or its actuality. A motion considered just as such is just the actual motion it is and it just proceeds however it actually proceeds.

In this sense, perhaps, every (actual) existent in a way measures itself. Presumably, though, the notion of time as a measure pertains to the temporality of natural motions, not merely such that each motion has whatever temporal existence it happens to have (or not merely such that it last for or takes just whatever time it lasts for or takes); but such that it, with respect to its temporality, may be compared with other motions—for example, so that it proceeds faster than or slower than or synchronically with another motion.

Claim (iiib), accordingly, proposes that time does this by being something distinct from every particular motion, and so capable of measuring it—not in its entirety, or with respect the entirety of its actuality, but in regards to its temporality and such that it may be compared in this regard with other motions. Time is capable of doing this by itself being a sort of magnitude, and (iiib1) proposes more precisely that it is a continuous magnitude.

Recall from Aristotle that a continuous magnitude is a magnitude which does not (actually) consist of minimal parts (for example, atomic magnitudes which do not themselves in turn consist of any further magnitudes), but a magnitude which is (potentially) infinitely divisible. The actuality of a continuous magnitude, moreover, is demarcated by termini, so that it is just the magnitude itself as it is terminated by or extends between those termini. Insofar as we suppose it to consist (potentially) of portions or segments of the sort of magnitude it is, each of these will itself be divisible infinitely. What lies between its own termini, in other words, must itself be another continuous magnitude (of that sort).

The termini of a continuous magnitude always delineate a certain definite magnitude. Insofar as a continuous magnitude is (actually) delineated by termini, it is itself a certain definite magnitude. Insofar as we suppose a potential portion or segment of the magnitude to be itself an actual magnitude, that portion or segment will likewise itself be a certain definite magnitude.

In light of this, (iiib1) is ambiguous in the way it proposes that time measures motion by virtue of being a certain definite (continuous) magnitude. More precisely, Plotinus' suggestion that we think of this formulation as portraying time as analogous to a line which "proceeds alongside the motion" may be thought of in two ways.

We might think of it as proposing that time is akin to a line of a certain definite magnitude which parallels a completed motion, and proceeds alongside it in that its first-terminus coincides with the motion's start-terminus and its second-terminus coincides with the motion's end-terminus—for example, a ten-second long time-line whose termini coincide with the start-terminus and the end-terminus of Achilles' one-hundred meter race. Alternatively, we might think of Plotinus' suggestion as proposing that time is akin to a line which is itself proceeding in a manner which parallels the motion's procession. It has a first-terminus which coincides with the motion's start-terminus, and it is itself proceeding in consort with the motion's procession—for example, so that as Achilles runs farther and farther, or more and more, the accompanying time-line lengthens concordantly. It in a way consists of an ever-increasing segment or portion of the line as it will exist coincident with the motion reaching its own end or end-terminus—for example, a one-second long segment then a two-second long segment, and so on, until Achilles stops running concurrent with its becoming ten-seconds long.

Aristotle's own account of time as it relates to motion, we have seen, is ambiguous in just this way. Inasmuch as Plotinus' critique of (iiib1) seems equally applicable to either of these ways of thinking about his line analogy, however, we need not resolve this ambiguity in Plotinus' analogy.

I shall not detail Plotinus' critique in its entirety. It will suffice to mention two principal lines of criticism. The first is couched in a series of questions [III.7.9, 19–21 & 24–27]:

> But how will this line-like magnitude which proceeds alongside the motion measure that motion alongside which it proceeds? Indeed, which of the two will be the one which measures the other? … Which one will be the one which measures? Alternatively, insofar as it will be the motion which is measured, what measures it will be a magnitude; but, in that case, which of them will be time? The motion which is measured, or the magnitude which measures it?

A second line of criticism against (iiib1) seems to continue Plotinus' remark that this line-like magnitude certainly could not be thought to

measure all motion but at most only the particular motion(s) alongside of which it proceeds [III.7.9, 22]. He, in particular, argues that [III.7.9, 37–43]:

> just as the motion, if it must be measured, surely could not be measured by means of itself but only by means of something else, it must likewise be the case that—insofar as the motion requires a measure which is something distinct from itself and it is on account of this that we presumed there to be a continuous measure which purportedly measures it—by the same reasoning the magnitude itself requires a [distinct] measure so that the motion may, by virtue of the magnitude which measures it having properly come to be a certain appropriate quantity, indeed be measured.

Despite Plotinus' excruciatingly awkward statement here of his argument, its gist seems clear enough. To see it, however, it may help first to ensure that the criticism implicit in his preceding flurry of queries is reasonably clear.

Plotinus' first line of criticism began by wondering why the line-like magnitude posited in (iiib1) should be thought to measure a motion merely because it proceeds alongside of the motion. He then wondered further why, insofar as we suppose that one thing measures another just by virtue of proceeding alongside it, we should consider the postulated line-like magnitude to measure the motion rather than *vice versa*. It may be useful to consider similar thinking regarding a locomotion's purported distance, or its spatial magnitude.

Suppose, just as (iiib1) purports regarding a motion's temporal existence, that a motion's spatial existence is measured by a line-like spatial magnitude which proceeds alongside of it. For simplicity, consider one stride of Achilles' running motion and the first of the two ways we might think of a magnitude as proceeding alongside of a motion (that is, a spatial magnitude whose first-terminus and second-terminus coincides with one complete stride of Achilles' running motion). Plotinus' mode of query would have us wonder whether this purported spatial magnitude measures the distance traversed by one of Achilles' strides, or whether the length of one of Achilles' stride measures the purported spatial magnitude.

Thus far we have discussed the distance Achilles runs using the spatial magnitude called the *meter*. For an even clearer example, consider the Ancient measure called the *cubit*. (Indeed, Plotinus himself a couple of times compares the notion of a temporal measure, rather than just to a line of some definite magnitude, and specifically to a cubit instead [III.7.9, 18 & 30].) The Ancient notion of the cubit originally, before

it was standardized, referred to the length of a person's forearm from the inner crook of her elbow to the tip of her middle finger. In this case, the query would be: Does a cubit measure the length of a person's forearm, or does the length of a person's forearm measure a cubit? Plotinus' query regarding the temporal magnitude (iiib1) purports proceeds alongside a motion and the motion itself—in effect, asking which measures which—is meant to be analogous.

Or, consider Plato's and Aristotle's notion that the temporal magnitude called the *year* is engendered by Sol's orbital motion around the Earth. Formulation (iiib1) would propose that 'a year' denotes a certain temporal magnitude whose first-terminus and second-terminus coincide with a certain start-terminus for each of Sol's orbits around Earth and an end-terminus for each of Sol's orbit around Earth (whereat Sol will have returned to the same Heavenly location whence it began an orbit). In this case, we can ask: Does the temporal magnitude known as a year measure Sol's orbital motion in regards to the time it takes to orbit Earth, or does the time it takes Sol to orbit Earth (the temporality of one of Sol's orbits) measure the temporal magnitude known as a year? That is, is how long it takes for Sol completely to orbit Earth determined by a certain temporal magnitude called a *year*, or is the temporal magnitude known as a year determined by how long it takes for Sol completely to orbit Earth?

My uses of the Achilles race-running example to illustrate various issues and points have tended to think of time—unlike the way Plotinus likely thinks of time—in a rather fine-grained, modern way. Conceptually anachronistic though it is, however, similar examples to Plotinus' query abound regarding "modern" time. As my wrist-watch ticks away the seconds, do these magnitudes of time called *seconds* measure the mechanical or electronic activity in the watch responsible for the ticks of its second-hand or for the ascending numerals of its digital seconds-readout, or do those mechanical or electronic activities measure the second-magnitudes? Or, in a cesium clock, does a certain temporal magnitude measure each pulse of the cesium atoms, or do the pulses of the cesium atoms measure the temporal magnitudes constituting time as delineated by a cesium clock?

Plotinus wonders, regarding all such cases, which of the two should more properly be designated to be *time*? Is time more properly the purported temporal magnitude thought to proceed alongside of a motion, or is time more properly the motion as it itself (temporally) exists and proceeds?

This sets the stage, moreover, for a second line of criticism of (iiib1). Suppose we do say that the more proper way to answer these queries is the former alternative in each case. Suppose, in other words, that the line-like magnitude purported to proceed alongside of a motion may properly be thought to measure the motion. Formulation (iiib1) posits, however—not that it measures the motion in just any respect whatsoever—but that it thereby temporally measures the motion, or measures it in regards to its temporal existence.

The gist of Plotinus' second line of argument here in effect poses the further question: How or why temporally? Or, how or why in regards to its temporal existence? What accounts for the temporal magnitude purported to proceed alongside of the motion being itself a certain temporal magnitude, being a magnitude of a certain temporal quantity? Plotinus' argument alleges that this would require postulating yet another magnitude to measures that purportedly temporal magnitude in such a way that it endows it with a certain temporal quantity (for example, which renders the temporal magnitude proceeding alongside of Achilles' running of the complete race a ten-second long temporal magnitude).

Plotinus may intend this line of argument to imply an infinite regress. At the very least, though, it challenges (iiib1)'s implicit proposal that time is most properly equated just with the purportedly temporal magnitude purported to proceed alongside of a motion. The flow of Plotinus' discussion, however, suggests that he intends this second line of argument to lead into (iiib2).

Indeed, Plotinus immediately turns to (iiib2), perhaps suggesting that the most plausible response to this second line of argument would be to propose that what measures this purported temporal magnitude is a certain number or sort of number ("the number of the magnitude which accompanies the motion"), and so this number most properly constitutes time—for example, the ten-seconds which measure the temporal magnitude purported to proceed alongside of Achilles' running of his race, or the one-year which measure the temporal magnitude purported to proceed alongside of each orbit of Sol around Earth.

The preceding discussion of (iiib1), though, may make Plotinus' critique of (iiib2) obvious. The two lines of criticism mentioned regarding (iiib1) may be read to argue in effect that, if time is to be identified with something which measures motion, there must be something which accounts for this measure's being a temporal measure—and which also

distinguishes it from other sorts of measures, and even from the temporality of the measured motion itself. Put another way, the temporality of temporal measures and the temporality of temporally existent motions presuppose time, and so cannot themselves just be time.

In the case of (iiib2), accordingly, Plotinus wonders why the number of the magnitude which accompanies motion should be anything other or more than just some numeric, or some system of numerical units (*ho monadikos*) [III.7.9, 46]. In particular, of course, why would this number-like system constitute a temporal system, or a system of temporally numeric units?

In wondering this, moreover, Plotinus is not merely questioning whether time properly consists of temporal units. To be sure, Plotinus does seem to agree with Aristotle that time as such does not consist of such items as days and years, much less seconds and nanoseconds. In his discussion of eternity, Plotinus thus associated time and our common conception of time rather with pastness and futurity—though he does stop short of the Aristotelian view that time as such consists of pastness and futurity instead, or that past and future are the constitutive parts of time. Nevertheless, his current criticism of (iiib2) does not seem to address this particular matter so much as the fact that a magnitude or definite extent must be a certain quantity of something, and he wonders what would account for the number-ing of temporal quantities—for the numbers which number temporal quantities being themselves temporal in nature.

A temporal measure measures the temporal existence of a motion because the sort of measure it is is a temporal measure. This is the sort of measure it is, however, just because it is or utilizes some temporal quantity. And this quantity is a temporal quantity because it is quantifiable and the sort of quantifier which quantifies it is a temporal quantifier.

But, what accounts for a quantifier being a temporal quantifier? Plotinus thus argues later in his critique of (iiib2) that, even if someone satisfactorily answered his queries, still

> one will not have found *time* measuring motion but a certain *amount* of time; and a certain amount of time is not the same thing as time itself. For, it is one thing to talk about time and another thing to talk about a certain amount of time. Before one can talk about there being a certain amount of time, one must first say what this is in virtue of which there is a certain amount of time. [III.7.9, 47–51]

Or, as he says later, "if something were to delineate a certain portion of time and measure it, time would already exist before the portion of it and prior to its being measured" [III.7.9, 77–78].

Perhaps, though, what makes a measure a temporal measure is not something apart from or additional to the measure itself but concerns the distinctive way in which it measures temporal existents. Perhaps what is missing in (iiib1) and (iiib2) is not some prior or independent account of time as such but an explicit statement of what about the line-like temporal magnitude, or about the quantifier, renders it indeed a temporal magnitude or quantifier—rather than some other sort of magnitude or quantifier.

In this regard, however, recall that (iiib2) itself was seen in part to respond to Plotinus' queries regarding (iiib1). Accordingly, (iiib3)—what we might call the more properly Aristotelian formulation of (iiib)—may be an attempt to improve on (iiib2) to rectify this omission in (iiib1) by specifying that the sort of measure which time is as it proceeds line-like alongside of a motion is one which measures motion "in accordance with before and after as it proceeds alongside the motion."

What is missing in (iiib1)—and so subsequently in (iiib2) as well—is thus the integral role of Aristotle's before-and-after to the sense in which temporal measures temporally measure the temporal existence of motions.

Plotinus does begin his critique of (iiib3) by insisting that it does not absolve the proponent of (iiib) from explaining what regarding the purported temporal measure itself accounts for its measuring a motion in this way: namely, in accordance with before and after as it proceeds alongside the motion [see III.7.9, 57f.]. The gist of Plotinus' intricate critique of (iiib3), however, seems more to argue that this formulation, too, begs-the-question. For one thing, the temporal before-and-after is not the only before-and-after there is. He points out, in particular, that there is also the spatial before-and-after—that 'before' and 'after' may also pertain to space and denote a spatial relationship [see III.7.9, 61f.].

Interestingly, Plotinus seems to maintain that the temporal before-and-after and the spatial before-and-after are two entirely different and distinct sorts of before-and-after. Aristotle, recall, indicated that the temporal before-and-after derives from the spatial before-and-after. Plotinus, though, seems to maintain that the primary sense of temporal before-and-after pertains to pastness and futurity ineradicably and from the outset. For instance, in one of the very few references to the now in his discussions of time, Plotinus asserts that "in general the [temporal]

before and after pertains to the time which culminates in the now and the time which commences from the now" [III.7.9, 64–66].

Accordingly, there are at least these two distinct senses in which a temporal existent may be measured in accordance with before and after. Consequently, as an account of time, (iiib3) just presumes that the before-and-after in accordance with which a purported temporal measure measures motions is indeed the temporal before-and-after. It begs-the-question, in other words, regarding what sort of before-and-after is the before-and-after in accordance with which purported temporal measures measure motions when they purportedly measure motions in accordance with the before-and-after.

Let us suppose, however, that purported temporal measures do in fact succeed in measuring motions in accordance with the temporal before-and-after. After all, they would not be temporal measures if they did not do so; and (iiib3) is not meant to explicate just any sort of measure but indeed just temporal measures. Even so, Plotinus' critique indicates a second sense in which it begs-the-question of what time is.

Plotinus, I have noted, does not seem to consider pastness and futurity to be constitutive parts of time as such, though he does seem to maintain that pastness and futurity (as opposed, for example, to days and years, or to a sequential ordering of nows or times-when) are primary manifestations or modes of time. Plotinus may thus hold that, rather, pastness and futurity themselves presuppose time. Consequently, (iiib3) conflates the temporal before-and-after with time as such. It purports to give an account of time whereas it instead gives an account of something which presupposes time—or which at most is a manifestation or, perhaps, a consequence of time—and so in that sense as well it begs-the-question regarding the reality and nature of time as such.

Plotinus remarks, for example, that something which measures a motion in accordance with the temporal before-and-after does so only insofar as it therein measures it in accordance with (*kata*) time itself [III.7.9, 59]. But, it therein measures it in accordance with time itself because the temporal before-and-after is "governed by time and dependent on it" (*exomenos tou chronous kai ephaptomenos*) [III.7.9, 61].

Just as he insisted against (iiib2) that magnitudes or quantities or amounts of time are not time itself, so too does Plotinus seem now to insist against (iiib3) that the temporal before-and-after (the before-now and the after-now) also are not time itself. Rather, they also presuppose, derive from, or depend on time.

Indeed, Plotinus adds toward the end of his critique of (iiib) that, in any case, time as such cannot be measured nor numbered, nor itself be a measure nor a number, because the reality of time itself is indefinite (*apeiros*) [III.7.9, 76]. Accordingly, he seems to imply, (iiib) itself is not merely too vague or general, and the three more precise formulations of it inadequate; rather, (iiib)—and so any formulation of it—is misguided from the outset.

As Plotinus argues also in the first of his three treatises on the kinds, modes, or genera of real existence [VI.1.5, 16–20], even if we suppose that time is something which can be measured or which measures motion, it would still be the case that

> insofar as time is understood in terms of what results from its measurement—as existing just insofar as it accords with some such definite quantity as, for example, the length of a year and so just insofar as it has been quantified—this understands time to exist just insofar as it accords with another nature distinct from its own, since the reality of a certain definite quantity of anything is essentially a matter of being just that definite quantity of something. Assuredly, however, time as such is not any sort of definite quantity.

Rather, Plotinus implies here as well, the reality of time itself, or as such, is indefinite.

CHAPTER TWELVE

PLOTINUS' NEOPLATONIC ACCOUNT OF TIME

The third phase of Plotinus' treatise *On Eternity and Time* articulates Plotinus' own account of the reality and nature of time. It is divided into three chapters. In chapter 11, Plotinus reconnects with his discussion of eternity in the first phase of the treatise and its Platonic conceit that time is an image of eternity. He proceeds to explicate this conceit utilizing features of his Neoplatonic metaphysics and of his account of natural motion developed in chapters 21–23 of the third treatise in the trilogy on the genera of real existents (written immediately prior to the treatise on time, and discussed in Chapter 10).

In chapter 12, Plotinus continues his explication in a manner more directly focused on the temporality of the natural universe and articulates his own account of the nature and origins of temporal measures. And, finally, in chapter 13, he continues the discussion of temporal measures in a manner which relates his account of time to how we commonly think about time—to our common conception (*ennoia*) of time—and to our consequent role in temporally measuring natural existents.

Time, for Plotinus as it was for Aristotle, is more closely related to motion than to any other aspect of natural existence. It most clearly manifests itself and its nature by way of motion and its temporality. Rests and pauses and absences of motion in the natural universe equally presuppose time and are in their own way temporal existents—as do and are, for instance, enduring or persisting natural substances. Still, Plotinus from the outset couches his own account of time primarily in terms of its relationship to motion.

Thus, recall, for example, Plotinus' remark, in critiquing the claim that time is just identical with motion, that [III.7.8, 3–6]:

> we say that motion of either kind [regular or irregular] exists by virtue of time; whereas if someone maintains that it does not exist by virtue of time, then motion would be all the more sundered from temporal existence, inasmuch as the reality of that by virtue of which motion exists would exists differently from motion itself.

By 'exists differently,' Plotinus especially means that it would exist atemporally. Time is related to motion, rather, at least in part because motion presupposes and exists by virtue of time.

Plotinus distinguishes time as such even from the temporal existence of temporal existents, even though the existence of time and our common conception of time pertains entirely to natural existence. For Plotinus, as for Aristotle, the natural universe is the temporal universe; and the temporal universe is the natural universe. One way to mitigate this tension is to recognize Plotinus' Neoplatonic approach to explicating something's reality and nature. In particular, for Plotinus, to explicate and account for something's reality and nature one must discern and explicate the reality and nature of its source (*arche*) or cause (*aitia*). Indeed, *what* something as such *is* in a way more properly refers to its source or cause, inasmuch as it is what it is only by virtue of its source or cause.

Consequently, while Plotinus' account of time is meant to explicate the temporality of natural existents, it does so in part by addressing the sources or causes of their temporal existence; and he Neoplatonically takes the notion *time* to more properly denote those sources or causes rather than the temporal (natural) existents denoted by our "common conception" of time.

Failure to appreciate this aspect of Plotinus' Neoplatonic methodology and perspective greatly diminishes accurately understanding his philosophy and its place within the classical Greek philosophical tradition—even as it, to be sure, also extends and develops that tradition in original and distinctive ways. Plotinus' philosophical conception and account of time and its relation to natural existence, on the one hand, and to his metaphysical principle and cause *soul* (*psyche*), on the other hand, is a prime example.

Plotinus' metaphysical system, recall, postulates three foundationally real existents (*hypostases*): the One, Intellect, and Soul. Together, these three are the sources or causes of all (other) real existents, including especially all natural existents. At the same time, they constitute a hierarchical system wherein the One is causative of Intellect, and Intellect in turn is causative of Soul. The details of this hierarchic system of relations, and the many textual and interpretative issues which surround it, are not crucial to the topic of time. Here, the key point is Plotinus' conception of the reality and nature of the natural universe as a final outcome or effect of this existential system.

Plotinus' numerous discussions of the hypostases in his *Enneads*, and

of the existential system they anchor, at times portray their hierarchical order as constitutive of a process of sorts which begins with the One and ends with the natural universe (or, more precisely, its materiality). This process is sometimes characterized as, indeed, Plotinus' procession (*proodos*)—wherein Intellect proceeds, or derives, from the One; Soul proceeds, or derives, from Intellect; and natural existence proceeds, or derives, from Soul.

It would be a mistake to infer from this ordering that Soul alone plays a causative role in the existential coming-to-be of natural existence, inasmuch as Soul is in a way instrumental to Intellect's causality, and the One's causality extends to all existents. Still, in the particular case of time and the temporality of natural existence Plotinus focuses on Soul, designating it to be nature's proper (as well as proximate) cause.

Plotinus opens his own account of time by reminding us of the "undisturbed and utterly whole and limitless quiescent life and steadfast totality, at peace in its unity and by virtue of its unity," [III.7.11, 2–5] constitutive of eternity; and postulates that "we may generate time by means of the character and nature (*logoi kai physei*) of what comes after it" [III.7.11, 5f.]. Inasmuch as 'eternity' denotes Intellect and Soul "comes after" Intellect, "what comes after" eternity is Soul.

Plotinus' opening remark thus implies that Soul may be thought to be the source of time. He avers [III.7.11, 8–18]:

> one might ask time, after it has come-to-be, how it happened that it came forth and came-to-be. Perhaps it would say something like the following regarding this: That previously, before it generated *the before* and yearned for *the after*, when it reposed alongside eternity in that reality [Intellect], it was not yet time but itself also lay quiescent in that reality. But, there also was an excessively busy and active nature, wanting its own authority and its own existence and desiring more than its current life, and when this moved it moved with it—and so they moved together, forever onwards towards what *will be* and *the after* and what does not remain the same but is one thing and then something else.

This "excessively busy and active nature" which seeks an authority and power all its own, independent of eternity, is Soul. In its quest for existential autonomy, Soul departs Intellect and its distinctive reality. Leaving the reality of Intellect behind in proceeding from it, Soul thus relinquishes its own eternity (timelessness).

The fate of Plotinus' imaginary friend (archetypal time) is thus linked to Soul's. When Soul departs Intellect's eternality, it conveys time along with it. As Soul consequently moves unceasingly onwards towards what

will be or what is yet to come—and so in that respect is forever another and again another—time does likewise. It therein becomes, or realizes itself as, time.

In the classical Greek context, everything has a cost—perhaps nothing more than autonomy and initiative. The cost to Soul, for its pursuit of autonomous authority and power, is eternity. Unlike Plotinus' classical antecedents, however, it is unclear whether he considers Soul's fate tragic. Its procession away from, "downwards" from, Intellect yields a new realm of existence over which it indeed does exercise authority and power, though its power remains slaved to Intellect (and so also to the One) as its aetiological precursors and sources.

Time is not, Plotinus has argued in the second phase of his treatise, a distinct existent which somehow "proceeds alongside" natural existence. So, too, is eternity not a distinct constituent or companion of Intellect. Eternal existents just are as such intellectually real substances, and *vice versa*. For time to be an image of eternity, accordingly, the natural universe must be an image of Intellect; and, further, perceptibly real substance must be an image of intellectually real substance—yet in such a way that its existence is in certain distinctive and distinguishing respects contrary to eternity.

Plotinus' account thus entwines time's existential aetiology with the natural universe's. Plotinus' discussion in the remainder of chapter 11 and in chapter 12 of the ineradicably entwined comings-to-be of time and natural existence (especially natural motion and change) is not an account of a temporal beginning to the natural universe. It does not even imply that natural existence had a temporal beginning.

Plotinus' earlier insistence, in phase two of the treatise, that time is indefinite (*aperios*) plays a role in the remainder of his discussion in two principal ways. First, he maintains that as such time is unmeasurable; and so in that sense it is not something definite. Second, he maintains as well that as such time is continuous (infinitely divisible); and so in that sense it does not consist of definite parts or segments. It also seems, though, that time is indefinite for Plotinus in the further sense of being unending, so that it indefinitely (infinitely) proceeds. In sum, time, or the temporally existent natural universe, will never cease, will never end.

Arguably, Plotinus maintains that time is indefinite in this third sense, as it were, to both sides. Plotinus' earlier insistence, *contra* Aristotle, that motion has a temporal beginning intends that any given (definite) motion must have a temporal beginning (if it is to be a particular,

definite, motion). But, this does not imply that the natural universe itself, or the totality of all natural motion, had a temporal beginning.

Previous discussion of Plotinus' treatise on time has already unearthed at least one reason to suppose that Plotinus does not consider the natural universe *in toto* to have had a temporal beginning. He has claimed that "in general the [temporal] before and after pertains to the time which culminates in the now and the time which commences from the now" [III.7.9, 64–66]. Since the notion of *the now* plays no evidently explicit role in Plotinus' account of time, it is difficult to discern precisely what he intends here. Perhaps he does have in mind something like Aristotle's notion of the now which continuously and unceasingly demarcates past and future, adjusted to his seemingly "fuzzy" way of thinking about what Aristotle insists must temporally be strictly indivisible.

It also seems possible, though, that Plotinus has in mind here something like *the present*—not some sort of phenomenological or specious present, to be sure, but perhaps something akin to Aristotle's notion of *the present now*. That is, Plotinus might intend here the concurrent totality of natural existents insofar as it contrasts with what no longer in reality exists and what does not yet in reality exist. I would not in reality be writing this (or at least surely you would not in reality be reading this) unless I (or at least you) were not a part of what in reality exists. If I in reality no longer exist or did not yet exist, then I would not in reality be writing this. Or, at least, if you in reality no longer exist or did not yet exist, then you would not in reality be reading this. What makes my (or at least your) existence *present*-ly real, however, is not that it is present to or for me (or that it is present to or for you) but rather that I am (or at least you are) in reality a part of that totality of existents with respect to which certain existents no longer in reality exist and certain other existents do not yet in reality exist.

Consequently, when Plotinus said earlier that time "generated *the before* [the past] and yearned for *the after* [the future]" he presumably meant that, as natural existents come-to-be in reality existent, they thereby contrast with (and so, in a way, demarcate) what no longer in reality exists and what does not yet in reality exists. Plotinus' characterizing time as *yearning* for the future (and only concomitantly *generating* the past in virtue of this) thus seems related to his earlier remarks discussed in Chapter 8 regarding the, as it were, existential momentum, or yet-once-again character, of natural existence and motion.

In any case, Plotinus does not intend, by characterizing time as hav-

ing generated the past, that the natural universe had a temporal beginning whereupon time has subsequently generated everything which has existed until now; but, rather, that time's role in the existential aetiology of whatever in reality concurrently exists is at least in part such that, insofar as anything in reality exists, this always implies that there also are things which no longer in reality exists (as well as things which do not yet in reality exist).

This may also shed light on why Plotinus, in contrast to Parmenides and Aristotle, does not seem to think of the past and future as constitutive parts of time. For, on his Neoplatonic approach, time in its most proper sense is to be explicated in terms of the existential aetiology or source of natural existence and not in terms of (or, perhaps more accurately, only secondarily or derivatively in terms of) certain outcomes and consequences of that causality.

The notion of again-and-again, of always-proceeding-further, dominates much of the remainder of Plotinus' discussion in chapter 11, as well as his initial discussions in chapter 12 of *On Eternity and Time*. Plotinus has portrayed the "excessively busy and active nature" which is Soul—which he also characterizes as "a certain potency which [unlike Intellect] is not quiescent" (*tis dynamis ouk hesuchos*) [III.7.11, 20]—as, because it desires "more than its current life," moving or proceeding in such a way that it conveys Plotinus' imaginary friend (time) along with it and together they proceed to move "forever onwards towards what will be and the after and what does not remain the same but is one thing and then something else."

I have noted that the sense in which this motion or procession generates an image of eternity has in part to do, on the one hand, with it in a way also bringing Intellect (and the One) along with it (or, remaining also slaved to and dependent on Intellect, and so also the One) and, on the other hand, with it culminating not just somehow in time-by-itself but in the coming-to-be of natural existence as temporal existence.

In developing this line of thought, Plotinus portrays Soul as "proceeding towards [or, passing into (*diexodon*)] multiplicity like the manifestation (*logos*) of a generative principle (*spermatos*) quietly unfolding itself" [III.7.11, 23f.]; and he also tells us [III.7.11, 30–34] that:

> in asserting itself independently from eternity, it produced time and then it subjected what came-to-be to its servitude by means of time, so that the totality it produced exists by virtue of time and it constrains everything which proceeds [or passes onwards (*diexodous*)] by virtue of time.

What came-to-be as a result of Soul's procession is the natural universe. Accordingly, the totality of natural existence exists by virtue of time, and consequently serves Soul. It brings to fruition Soul's yearning for autonomy and is subject to Soul's authority and power.

Consequently, anything and everything which proceeds to exist or move or come-to-be in the natural universe is constrained and governed by Soul as a result of its existing or moving or coming-to-be "by virtue of time." In so doing, Soul may itself be thought of as proceeding into multiplicity, on the analogy with a generative principle or seed (*spermatos*) and its manifestation or expression (*logos*). In this manner, Soul "displays its actuality in one thing after another, and then again yet another in ordered succession, and so generates ordered succession in accordance with its actuality" [III.7.11, 36–38].

Much as Aristotle's account of time has often been reduced to his statement regarding "the measure of motion in accordance with before and after," Plotinus' account of time has come to be associated especially with a statement he is about to make in chapter 11 of his treatise. Plotinus characterizes the ordered succession of "one thing after another and then again yet another" which displays Soul's autonomous actuality, as a new sort of life—that is, as a different sort of life from the eternal life of Intellect, and so also of Soul insofar as it inheres in Intellect as its source and cause. Plotinus posits, in particular, that [III.7.11, 40–43] Soul's

> current [descended] life no longer resembles the [eternal] life which precedes it. Immediately, its life is consequently different, and its difference is a difference linked to time. The extending-forth (*diastasis*) of its life is thus linked to time, and the unending (*aeu*) procession of its life is linked to time unending.

Plotinus further states that one might therefore say that time is "*the life of soul as it moves by passing* [or shifting (*metabatike*)] *from one mode of life to another*" [III.7.11, 44f.]. Understanding the meaning and implications of this statement is, of course, pivotal to understanding accurately his account and conception of time.

Soul's motion as it proceeds from Intellect, Plotinus posits here, may be thought of as shifting or passing from one mode of life to another mode of life. The mode of life from which it passes is eternal life (Intellect). The life to which it passes is life linked to time, life as an unending procession linked unendingly to time. Indeed, the life to which Soul passes is linked to (or bound by) time because we may identify time just with this shifting or passing of Soul from its previous life to this new life,

inasmuch as this procession is the source and cause of the temporality of natural existence. Again, recall Plotinus' Neoplatonic approach, wherein a concept or term most properly denotes the source or cause of what we would commonly (in our "common conceptions") take to be its denotation.

Previously, Soul led a life of eternity. Now it leads the life of time. Plotinus, accordingly, associates time—in its, as it were, Neoplatonic meaning—with the cause of Soul's new life, with Soul's proceeding or shifting from its metaphysically prior life to this new sort or mode of life. For, Soul produces or generates this new form or mode of life for itself just by virtue of proceeding from Intellect.

The remainder of chapter 11 of Plotinus' treatise indicates, though, that Plotinus does not intend that Soul's new mode of life and its "shifting" to that new life are somehow distinct from one another. Soul embarks upon its new life just by departing its old one; and it produces this new life just by embarking upon it. It generates it just by commencing it. In an analogous fashion, one generates a life of philosophy for oneself just by living a philosophical life; and one lives a philosophical life beginning just when one begins philosophizing. Analogously, Achilles becomes a runner just by running; and he runs beginning just when he begins running.

Accordingly, Soul's procession from Intellect may be thought of as the cause of time as an image of eternity (and so of the natural universe as an image of Intellect), or its procession may be thought of as itself that image of eternity (and so as this image of Intellect). The natural universe, in other words, is not an artifact of Soul's procession which then moves on its own, independent of Soul. This pivotal point becomes a primary theme in chapter 12 of *On Eternity and Time*.

The remainder of chapter 11 characterizes some of the ways in which Soul's new mode of life differs from the eternal life of Intellect (even while it also is an image of that life). The ways in which Soul's new life contrasts with eternal life include that it "does not reside in the same but does (*energoun*) one thing and then another" [III.7.11, 53]; that its unity is not a matter of indivisibility (*adiastatou*) but of its being "one by virtue of its continuousness (*en synecheiai*)" [III.7.11, 54]; that it is indefinite (*apeiros*) just by virtue of its "unending ordered successiveness (*to ephexes aei*)" [III.7.11, 55]; and that its totality or completeness (*to holon*) consists in the manner in which it "is going to be, and is unendingly going-to-be, part-by-part (*kata meros*)" [III.7.11, 56].

Note that the combined characterization here of Soul's procession

as a continuous ordered succession of one "doing" after another, such that it is unendingly going-to-be or coming into existence part-by-part, is equally a good characterization of natural existence itself. Indeed, although I do not pretend fully and explicitly to make the case here, the account of Plotinian motion provided in Chapter 8 (in the context of his critique of Aristotelian motion) is for Plotinus in a way also an account just of natural existence as such. That is, part of the intent of my conceit for Part III of this investigation of Plotinus' *vitalistic Platonism* is the notion that for Plotinus "the actuality of motion(s)" in fact just is the fundamental nature of our universe, of natural existence. A second main aspect of the intent of this conceit will emerge at the end of this chapter, where we shall see that for Plotinus all (actual) natural activity and motion is in turn fundamentally vital ("living") in character.

In any case, Plotinus thus thinks of Soul's procession as a horizontal procession of continuously successive doings and goings-to-be part-by-part as much as a vertical procession from Intellect and its eternity. Or, put differently, Plotinus thinks of Soul's procession from Intellect as both vertically generating a new mode of real existence (temporal, natural existence) and as doing so horizontally—by continuously generating one concurrent totality of natural (temporal) existents (fuzzily-)after another, unendingly "striving" toward what *will be*, toward what *will succeed* what currently *is*. Soul's "wanting its own authority and existence and desiring more than its current [eternal] life" is thus a yearning both for its own autonomous authority and power, and therein forever for "what *will be* and *the after*."

A principal theme in chapter 12 of the treatise, accordingly, is that Soul's conjoint procession downwards (into a new mode of existential multiplicity, or "life") and forwards (or future-wards, as a determinative or distinguishing feature of that mode) constitutes the aetiology of temporal existence and the coming-to-be of the natural universe. Plotinus avers, for example, that [III.7.12, 21–25]:

> clearly, the beginning of soul's motion towards this [natural] existence and this mode of life generates time. Time is therefore said to come-to-be concurrently with the universe, because soul generated it along with the universe. For, it is by means of this sort of activity [soul's motion] that this universe has come-to-be; and this activity also is time, so that the universe exists by virtue of time.

Soul's role as the source or cause of natural existence is thus equally fundamental both to Plotinus' account of time and to his account (natural) motion.

Plotinus' account of motion, of course, does not directly address the coming-to-be of natural existence as such. As in his earlier critique of Aristotelian motion, Plotinus' account here focuses on motion as we commonly ascribe it to perceptible substances—for example, the motions and changes initiated and (or) undergone by Achilles and by our friendly chameleon, by rivers and trees and Heavenly bodies.

Indeed, I have suggested, much of how Plotinus generally thinks about natural motion is already evident in his critique of Aristotelian motion—for example, his insistence there that motion must be entirely actual from its onset, that the sort of actuality which motion is is one which proceeds recurrently ("again and again," "embracing its own actuality yet again"), and that it therein continuously brings about certain states of affairs (including temporal ones). Plotinus thus explains elsewhere, for example [VI.3.22, 35–43]:

> But, what is the common feature shared by alteration and growth and coming-to-be and the opposites of these, and also of change with respect to place, in virtue of which these are all motions? It is that in each case the thing does not remain the same—does not remain as it previously was—and does not remain utterly still and quiescent but so long as motion is present the thing has an unending urge toward something else—to be different, to not remain the same. For, motion is destroyed insofar as there is no 'something else'. For this reason, too, differentness here is not a matter of its coming-to-be and then remaining different [from how it was previously] but [so long as motion is present] of its unending differentness.

But, what is the source or cause of all this, of motion as such?

In chapter 23 of his third treatise on the genera of real existents, Plotinus does not mobilize his entire metaphysics so as to answer this question fully. He does, however, provide a first step toward supplying an answer by indicating that the beginning or source of a motion lies outside the moving thing itself [VI.3.23, 1–5]:

> motion comes into perceptible things from another which stirs and prods and enervates and pushes those who participate in it so that they do not pause nor remain in the exact same condition in order that they may be caught up in that restlessness and busyness which constitutes this image of [eternal] life.

Notice that Plotinus characterizes motion as itself coming into natural existents, into perceptibly real substances. Though Achilles is surely the one who is running, and the chameleon is surely the one who

is undergoing a color change, Achilles and the chameleon are not themselves the real causes of these motions as such.

In his earlier critique of the thesis that time is the extension or distance of a given motion, Plotinus argued that were the ongoing recurrent procession ("plenitude") of a motion "to appear by itself to someone looking at it … in such a case time would neither appear to his sight nor otherwise present itself to him, but just motion 'again and again'." Now, however, Plotinus also challenges the supposition that the motion (or its actuality) as such "appear[s] to our sight."

Plotinus continues his remarks concerning the relationship between motion and perceptible things by arguing further [VI.3.23, 5–13]:

> We must not suppose that the things which are in motion are the existent motions. For, walking is not the feet but an actuality proceeding from a certain potency to possess the feet. Since the potency cannot be seen in the authentic condition in which it exists [as a potency], however, it is necessary to look at the activity of the feet—that is, not simply the feet as when they were at rest but as they are now embraced by another existent. This existent cannot as such be seen but by its relationship with something else [the feet] it can be seen accidentally (*kata symbebekos*) when one looks at the feet as first one assumes a certain position and then the other one does and they are not still. But the alternating bipedal motion one sees is a consequence of the alternating feet whereas the walking-motion itself is not something qualitative regarding the feet.

In chapter 22 of that treatise, Plotinus indicated how the Aristotelian notion of potentiality may be incorporated into his own account of motion, by understanding the Aristotelianesque formula that "motion is the procession (*hodos*) from potentiality to what something is said potentially to be" [VI.3.22, 4f.] to express the fact that something cannot come-to-be or move in a certain way unless it is capable of being or moving that way. For example, a block of marble could not come-to-be a statue unless it is the sort of thing which is capable of being a statue; or, something cannot walk or run unless it is the sort of thing which is capable of walking or running. In this sense, when something comes-to-be or moves in a certain way its doing so "proceeds from" a certain potentiality it has [see VI.3.22, 5ff.].

Here in chapter 23, however, the notion of *dynameis* as it pertains to actual motion has additional meaning for Plotinus. In the Aristotelianesque formula, it denotes something's capacity to come-to-be in a certain way, or to perform or undergo a certain sort of motion. Now, however, it also denotes the motion as such as it "comes into" a

natural existent and "stirs and prods and enervates and pushes" it in the perceptible ways we commonly presume to be the motion itself. It now denotes, that is, a potency or active power which is not as such perceptible but which in reality constitutes the actual motion. Plotinus indicates that we may also think of this potency as proceeding from its source (Soul) into a natural existent "as a breath of air proceeds into another" [VI.3.23, 20]; but he states as well that [III.3.23, 20–25]

> when the motional potency is a walking-potency it pushes, as it were, and productively moves the walker's feet continually to assume one position after another; and when it is a heating-potency it heats something; and when the [motional] potency brings matter together into a natural assemblage it is the generative potency of natural growth.

Once again, motion's source has both a vertical and a horizontal dimension, or aspect.

In an attempt to explain how Soul's procession yields a material (corporeal) universe, Plotinus argues that [IV.3.9, 21–24]:

> if corporeal things were not real existents, soul could not proceed because it is not predisposed to exist in any other sort of place. But, since soul must proceed, it generates space for itself, and therein also corporeal things.

Corporeality—that is, ("static") extensionality, spatiality, or materiality—are (perceptible) artifacts of Soul's generation of natural existence.

Plotinus sometimes integrates both the more general effects of Soul's procession (for example, its ubiquitous generation of space, or corporeality) and its more specific effects (for example, a walking motion, a living chameleon) by attributing an internal complexity to its procession, wherein Soul's motion itself diversifies into various specific sorts of actualities or causative potencies. Plotinus thus argues as well, for instance [VI.7.7, 9–17]:

> For, what is there to prevent us from saying that the potency of the soul of the entire universe, since it is the universal forming-principle (*logon panta*), produces the universe as a sort of preliminary sketch before the [many] soul-like potencies subsequently proceed as well, and that this sketch is something like preconditioning luminations existing in matter so that a soul which continues the work by following a given sort of tracings produces a corporeal thing by detailing the tracing part by part so that each such soul becomes a forming-principle in relation to that corporeal thing to which it then properly proceeds by configuring it to itself—as a dancer assumes a role which has been suitably adapted to her.

Plotinus is not proposing a cosmogeny here. He is not postulating that the natural universe has a certain cosmogenic history wherein Soul first "sketched" the cosmos, and perhaps certain of its fundamental constituents and denizens, and then subsequently diversified itself into various specific sorts of souls which proceeded in a second cosmic epoch to "fill in" that sketch—perhaps then followed by yet a third epoch consisting of natural existence as we perceive it today. Rather, he is depicting an ongoing existential process and some of its inherent complexity—which, accordingly, fully applies even now, today.

Still, Plotinus does invite us to distinguish two aspects of the generative potency of Soul's procession. On the one hand, it is responsible ongoingly for the real existence of the natural universe and, for example, its fundamental organization. On the other hand, it (or, perhaps more perspicuously, the various specific souls or soul-potencies inherent in it) is responsible ongoingly for the particular natural processes and motions which "come into" nature and natural existents.

The former context seems more pertinent to accounting for the temporality of natural existence and motion as such. Whereas, the latter seems more pertinent to accounting for various specific features of that temporality—for example, when we measure a particular existent's or motion's temporality. Accordingly, the former is also the context of time's inherent indefiniteness; whereas, the latter is also the context of, for example, determinate magnitudes of time's passing.

Indeed, the remainder of chapter 12 of Plotinus' treatise on time focuses on the nature of temporal measurement, or at least what we commonly think of as temporal measurement. Plotinus' own account of temporal measurement is rooted in Plato's own moving image of eternity: the cosmos, or Heavens. In that regard, Plotinus focuses especially on Sol's daily circuit around Earth. He avers [III.7.12, 29–39]:

> For, inasmuch as time as such was not delineated [limited, generated as inherently definite] by soul, and nor could individual portions of time as such be measured by us since it was invisible and indiscernible to us and in any case we were ignorant of how to count [or numerate (*arithmein*)], night and day were made so that we could discern *two* by virtue of the difference between them and from this beginning, as Plato says, acquire a general impression (*ennoia*) of number.
>
> Then, by observing too the interval from one sunrise to the next and supposing the interval to constitute an extent of time [or a temporal duration (*chronou diastema*)], inasmuch as the motion upon which we were basing the interval is regular ["even" (*homale*)], we acquired the idea of a certain amount of time and were able to use it as a sort of measure—as

> a measure of time, even though time as such is not a measure. For, how could it measure? What would it say when it measured how much it was? That this is just how much I am?

Temporal measurement requires two things: The ability to count or numerate, and a notion of a certain temporal duration. And, Plotinus here postulates, humanity first developed this ability and acquired the general notion of (definite) temporal durations from observing the day-night cycle engendered by Sol's celestial motion around the Earth. Additionally, Plotinus reminds us that time does not as such measure or "numerate" itself. He will later posit, rather, that the notion that time is measurable, or that it comes in or takes definite measures or amounts, is "accidental" (*kata symbebekos*) [for example, III.7.12, 43 & 55].

Plotinus had opened chapter 12 of *Eternity and Time* by recognizing that we commonly presume that any given natural motion of any sort is temporally measurable, and that pauses or absences of motion in the natural universe are temporally measurable as well; and yet, temporal measurement is possible only because [III.7.12, 2–4]

> the extension (*mekos*) of this sort of life proceeds effortlessly forwards, proceeding by regular and uniform transitions while being continuous in its actuality.

This brief statement juxtaposes two potentially conflicting aspects of Soul's procession (and so of motion generally). In particular, Plotinus posits that Soul's motion (and so time as it is generated by this motion) proceeds both in transitions or stages (*metabola*) and also continuously (*synexes*). In a similar vein, Plotinus previously characterized Soul as "unfolding" itself both part-by-part and yet also unendingly or unceasingly; and he has characterized motion in general as proceeding recurrently, "again and yet again," even while there too emphasizing its continuousness. Yet, Plotinus himself seems not at all troubled by any potential conceptual conflict here.

One reason may be implicit in Plotinus' distinction between the actuality of a motion (or the active soul potency which in actuality the motion is) and its observable manifestations. In his example of walking-motion, Plotinus has thus contrasted the walking-motion itself and the walker's moving feet. The walking-motion itself proceeds continuously (unless, or until, it ceases altogether); whereas its manifestation in the observably moving feet makes it appear to proceed in a step-wise [sic] fashion.

But, even focusing on the moving feet, we can think of their walking-motion either as something they are continuously doing or as something they are doing step-by-step, stride-by-stride. Although Plotinus would insist that someone is entirely and actually walking from the very outset of the walking-potency "coming into" her feet—that is, manifesting itself perceptibly by means of her feet—it also seems that we would commonly insist that someone must accomplish (or display) some discernibly walking-like motion (for example, taking a first step) before we say that she is actually walking. And, as she continues walking, we can mark-off the recurrences, the again-and-again, of her walking-motion as it manifests itself in her steps or strides even though her walking-motion is as such continuous.

Surely, though, this manifestation of the walking-motion, or walking-potency, is due to the nature of the walking-motion itself as it utilizes or "comes into" the perceptible feet and their perceptible changes (motions). Consequently, actual motion is continuous; and yet a recurrent or incremental-like character is inherent in the nature of its actuality. Plotinus thus seems in a way to be searching for a third way, or middle ground, between holding that motions are merely potentially divisible into just any sort of stages or increments (as a line or line-segment is potentially divisible anywhere one chooses along its length) and holding that they in actuality consist of certain (discrete, predetermined) stages or increments.

How could a person possibly walk a thousand miles? One answer is: one step at a time. Something about the "impetus" or "urge" forwards which constitutes the actuality of motion quite naturally and properly manifests itself, in the case of walking-motion, in a person taking one step and then another even while the walking-motion itself is also quite naturally, and in a way more perspicuously, a continuous motion "of the walking sort." Even if we insist that a motion does not in actuality consist of those recurrent stages or increments (but the motion as such is only potentially divisible into them), Plotinus could at least say that it is not just capriciously or arbitrarily divisible into any stages or increments whatsoever one might choose; rather, the nature of a given (sort of) motion's actuality is such that it is potentially divisible into certain sorts of stages or increments rather than others.

Another feature of this opening statement to chapter 12 is its reference specifically to regular, or "even" (*homalais*), and uniform, or "alike" (*homoiais*), transitions. This is a chief characteristic of Heavenly motions,

and may add to their role in our acquiring "the notion of a certain amount of time." Plotinus is emphatic, though, that there is nothing, as it were, metaphysically special about the Heavenly motions as sources for temporal measures. Like every other natural existent, the Heavenly sphere(s) "exists and moves just by virtue of time and, were it to rest, we could then measure for how long it rests …" [III.7.12, 17f.].

Still, Plotinus' association here of temporal measures just to regular and uniform motions suggests that for Plotinus (as for Aristotle) only such motions are temporally measurable, can actually be measured. All motions, however, take time to proceed, and upon their cessation will have taken a certain definite amount of time to proceed (including irregular or variable motions), as do all pauses or absences of motion. Moreover, Aristotle's inability to handle irregular motion was a principal point of Plotinus' criticism in his critique of Aristotelian motion. Indeed, Plotinus has explicitly insisted that all motions and all pauses or absences of motion in the natural universe equally exist or proceed only by virtue of time.

Perhaps, though, Plotinus' point is just that irregular motion cannot as such be measurable. Suppose Achilles's ran faster and faster, or ran sometimes faster and sometimes slower, during his race. We could still measure how long it takes him to run his complete race. If he completes his race in ten seconds, he does so whether or not he strides regularly and uniformly from start-terminus to end-terminus. This result, however, measures or "numbers" a certain state of affairs brought about by Achilles' running of the race—for example, the total amount of time it took him to run the entire race. How, though, does it relate to measuring the actuality of his running motion, his actual running motion as it actually proceeds?

If an attempt to temporally measure his running motion revealed that he ran the first forty meters of the race in five seconds and the remaining sixty meters in five more seconds, this would indicate something about the irregularity or variability of his running motion. Indeed, if we refine our measuring capabilities enough to measure very short distances for very brief amounts of time, we could even come close to saying that Achilles sped up or slowed down such and such an amount during or between two such very brief amounts of time, if during the first very brief amount of time he ran such and such a distance and during the second very brief amount of time he ran so and so longer a distance. Otherwise, we could relate the total time to his running motion as such only as an average of each stride he

takes. And, in the case of a pause or absence of motion, all we can ever measure is its entirety.

Of course, every motion, insofar as it has ceased, and so has taken a certain amount of time, is in a way a regular motion inasmuch as it is one occurrence of the entire motion it was. Still, Plotinus holds that there is something about every motion or sort of motion which in virtue of its "actuality" or the causality of its "active potency" is recurrent (even while ongoing); and he wishes to relate this to the nature of time. Plotinus states [III.7.12, 45–51]:

> if someone said that the motion and the celestial circuit in a certain sense measures time, insofar as this is possible, inasmuch as the circuit by virtue of itself being a certain amount displays (*delousan*) a certain amount of time, which in reality could not be recognized (*labein*) nor cognitively enjoined (*syneinai*) otherwise, this way of presenting it would not be absurd. In this sense, what is measured out by means of the celestial circuit—that is, what is displayed by it—is time, but not as something brought about [or, generated (*gennetheis*)] by means of the circuit but as something displayed by means of it.

Again at the beginning of chapter 13, Plotinus characterizes the pertinence of the celestial motion(s) to our ability to recognize and cognitively enjoin time as due to the fact that time "can become manifest to us (*emphainesthai*) especially through something regularly ordered, and it can thereby be exhibited to us (*prothainesthai*) such that we may arrive at a general impression (*ennoian*) of it" [III.7.13, 5 f.].

Plotinus' key point here is subtle yet important. It is not exclusively about "regularly ordered" motions (and, Plotinus immediately adds in this case, regularly ordered pauses in or rests from motion as well); but the point seems clearest in that context, given regular motion's role in our cognitive development in regards to time, or temporality. In particular, though the interval between Sol's successive arrivals at a certain celestial location does in way "display" or "manifest" the temporality of its circular procession, it would be a mistake to infer that the temporality of that interval is itself a day-long. What is a day-long is Sol's orbit around Earth, and so Sol's motion as it proceeds by virtue of time.

Perhaps a way to see the point here more clearly is to recognize that if we then measure some other motion (or some absence of motion) employing the notion of the day as Sol's celestial cycle in orbiting Earth, we are presuming that that other motion manifests time or proceeds by virtue of time the same way Sol does. If we say, for

example, that a flower takes a day to bloom, we are implying that the time it takes for the flower to open is the same as the time it takes Sol to orbit Earth.

Plotinus has insisted that time as such is indefinite (*apeiros*); and he has argued that from the perspective of time itself, as it were, time is always just however long it is and any given amount of time is just whatever amount of time it is. That each of Sol's orbits around Earth takes what we think of as a day-amount of time pertains to time as it becomes manifest or is displayed to us by means of Sol's motion; and that the flower takes a day-amount of time pertains to time as it becomes manifest or is displayed to us by means of the flower's blooming (and we compare the flower's blooming to Sol's orbit).

Such temporal notion as days and years, or (for us today) even seconds and nanoseconds, denote certain ways in which the natural universe presents time, even its own temporal existence. And yet, it is by virtue of time that motion proceeds, and in a manner proper to that motion or sort of motion. At the end of chapter 13, Plotinus thus indicates that in the case of someone walking in regular recurrent strides, we may attribute this to a sort of proceeding by equal increments or extendings (*isa dieistekei*) on the part of his soul's motion inasmuch as the soul's motion is the source or cause of the corporeal strides he is taking [III.7.13, 61f.].

Notice, however, that Plotinus is not claiming (and nor does he presume) that there in effect is some sort of universal uniform unit of time. In virtue of time, every motion—whether corporeal or cognitive, physical or mental—will have or manifest (so long as it proceeds in a regularly recurrent fashion in regards to its actuality) an inherent cadence or rhythm; and, for Plotinus, that this is inherent to natural motion "in virtue of time" means that it is a consequence of Soul's *modus operandi* as it proceeds from Intellect. It is patently absurd, however, to suppose—as contemporary commentaries on Plotinus' account of time typically do suppose (and assert)—that the regular or standard rhythm, for example, of Soul's activity as it "rouses" a human's heart to beat and the regular or standard rhythm of Soul's activity as it "prods and pushes" the outermost Heavenly sphere in its repeating circular motion are somehow the same.

In a related vein, although it may not be so patently absurd, it requires stretching Plotinus' account well beyond its straightforwardly simple posit that acting in "regular intervals" is characteristic of Soul's *modus operandi* to suppose—as contemporary commentaries on Plotinus'

account of time typically also suppose (and assert)—that some sort of native time-unit or -cadence is inherent to human thought and awareness, or to Soul's operation insofar as this manifests itself through the instrumentality of particular human souls as they, in turn, manifest themselves through the instrumentality of human thought and awareness.

For one thing, this supposition saddles Plotinus with an obviously false factual claim to the effect that whenever you and I do attempt to mentally "number time" for ourselves (or, for that matter, if either you or I attempt to do this on two different occasions) we (or you, or I) will always count-out the same (or even just some unchangingly comparable or "regular") time-like cadence. In addition to the empirically evident falsity of such a claim, this supposition also reasserts in a different form the hugely anachronistic assumption that classical philosophers (here, of course, Plotinus) think of temporal regularities or "numbers" in a modern, fine-grained sort of way. For example, it may be useful for expository purposes to think of Achilles taking 10 seconds to run his race; but it seems implausible to suppose that Plotinus thinks this way.

But, then, what is time for Plotinus? Plotinus' Neoplatonic approach, of course, has identified it primarily and properly with Soul's vertical-*cum*-horizontal motion as it proceeds or derives from Intellect. But, how might a philosopher who is not imbued with Plotinus' Neoplatonic mind-set think of it upon reading Plotinus' treatise?

There are, I think, two main elements to this question's answer. The first concerns what Plotinus seems to say in chapter 13 of the treatise (and what he has said in previous discussions) in regards to the temporal before-and-after and its relation to motion's recurrent, continuously proceeding nature.

Plotinus does consider the temporal before-and-after to involve the distinction between what was before-now (pastness) and what will be after-now (futurity). Plotinus has already suggested, for example, that "before it generated the before and yearned for the after" time did not exist, or at least it was not time [III.7.11, 10]. But, in chapter 13, Plotinus refers to those who attempt to equate time with the before and the after, and insists (faithful to his Neoplatonic approach) that time as we commonly associate it with natural existence and motion would consist of the before and the after only if and insofar as this may be due to its source or cause (Soul's procession) [III.7.13, 30–38]:

> If someone were to consider the before and the after of motion here and asserted that this is time—presuming that this in some sense exists—but were to deny regarding the before and the after attributed to the more authentically real motion that it exists, this would be absurd. For, he would be freely attributing the before and the after to soulless [natural or corporeal] motion and time as it pertains to it but not granting this to the motion on account of which this [soulless] motion has come into existence by imitating it—indeed to the motion on account of which the before and the after first came into existence.

How, though, could the temporal before-and-after—which Plotinus earlier characterized as "the time which culminates in the now and the time which commences from the now" [III.7.9, 64f.]—pertain to Soul and its procession?

The primary consequence of Soul's motion constitutes, or is, natural existence. Accordingly, from Soul's perspective, as it were, *NOW* would designate just whatever in reality exists in or regarding the natural universe. Presumably, then, the time which culminates in the now would with respect to Soul consist of what has in reality existed by virtue of its existential causality but no longer does; and the time which commences from the now would consist of what will in reality exist by virtue of its existential causality but does not yet.

Soul's procession, we have seen, is equally vertical (from Intellect) and horizontal (part-by-part). It would seem that past and future in regards to Soul would pertain to the latter aspect of its procession insofar as it is generatively responsible for past and future in regards to natural and corporeal existence. The Soul's past would, as it were, be what it was doing but no longer is and its future what it will be doing but isn't yet. Indeed, Plotinus a bit later characterizes the relationship between the proceeding Soul and time in a three-fold way. He avers that Soul, when it proceeded from Intellect, was "the first to *enter* into time and yet it *generated* time and also *possesses* time in conjunction with its activity" [III.7.13, 45f.].

It is fundamentally important, accordingly, that *Soul's conjoint vertical and horizontal procession does not occur "inside of" Soul. Rather, it is what Soul does*. Indeed, it even is just what Soul is as it proceeds from its condition as, like every effect, pre-existent in its own cause (Intellect) into its own autonomous ever-future-wards multiplicity.

Plotinus explains how Soul's motion is "the motion on account of which the before and the after first came into existence" by continuing [III.7.13, 38–40]:

> inasmuch as its existent motion is self-moving (*autourgou*) and so, as it thereby generates each of its own activities, it also generates them in ordered succession and, concurrently with generating this, its own transition [or, change or shift (*metabasin*)] from one to another as well.

Soul's primary job or activity, as it proceeds from Intellect, is to be the source or cause of real existence in the natural universe—that is, of the natural universe's real existence. Here, Plotinus depicts this causality as involving an ongoing sequence of such activities; and he explains that, since Soul is self-actuating with respect to its activity, it is responsible for its procession's orderly successiveness and therein also for its own shifting from one activity to the next.

Soul's existent motion, as it self-generates its own generative activities, is consequently responsible for each of its own successor-activities. As Plotinus had characterized it earlier, Soul's motion seems unceasingly a motion towards what *will be*—an impetus or urge unendingly toward further existence, toward existence anew.

The self-moving nature of Soul's motion accounts for its generative activities proceeding again-and-again, for their orderly succession one after another. They are not ordered just by happenstance, or by another outside cause. Each is accounted for by the self-moving motion (activity) before it, even while that previous generative activity has therein done its job and no longer *is*.

A second key element of Plotinus' conception of time's reality to emphasize is also best explicated in terms of the part-by-part (horizontal) aspect of Soul's procession. In particular, Plotinus gives three main sorts of examples pertinent to the way in which coming-to-be manifests Soul's generative part-by-part operation. Thus far, in the foregoing, the first sort of example has implicitly been emphasized: In the two examples of the lap-walker and of Sol's diurnal orbit, the ongoing recurrence of certain observable phenomena—the walker's bipedal strides, and for instance Sol's repeated risings—were seen to manifest the onwards again-and-again character of Soul's motion as it "stirs and prods and inervates and pushes those [natural existents] who participate in it so that they do not pause nor exist successively in the exact same condition" [VI.3.23,1–4]; or, as it "forces something onwards … pursuing and destroying countless [observable] forms" [VI.4.27,23–25].

In Plotinus' second main sort of examples, the pertinent observable (perceptible) parts or forms are the *organic parts* of living things. Two related features of living organisms seem especially pertinent here: First, a living thing's organic parts may more evidently be recognized or dis-

cerned as part-by-part manifestations of a natural form of existence (for example, its humanity, or some other form of animality) intended, or self-actuated, by Soul. Secondly, the organic *unity* of the living thing may more evidently seem conceptually related to the *dynamic* character of its part-by-part or form-after-form coming-to-be.

Arguably, a static conception of a living organism's sequentially ordered observable conditions during its life-span (as if, say, a sequence of snapshots of it were arranged side by side on a table) would no more clearly manifest the fact that these conditions were brought about by, or are conditions of, *one and the same* natural existent than does the properly static conception of the spatially related conditions comprising various spatial portions of one's environment.

As we observe our environment day-to-day, we discern various natural existents within it. We especially do this regarding those natural existents persisting from day to day whose different "conditions" day-to-day are explicable as manifestations of one and the same *organic* (if you will, self-differencing) existent. Unlike mere patterns (even recurrent patterns), an organic unity displays an ongoing sameness-in-difference wherein *what is* is uninterruptedly linked to *what has been* and indicative of *what will be*.

Indeed, on Plotinus' account, every aspect of a natural existent's current condition is part of its existential procession as governed (or formed) and powered (driven onward, or future-wards) by Soul. He thus informs us [II.4.8,23–28]:

> When the form proceeds to matter [that is, when Soul generates a natural existent part-by-part] it brings everything along with it, since the form encompasses everything—even magnitude, and everything else, in accordance with the forming-principle and what proceeds from it. Magnitude is thus delineated for each sort of natural thing because of its form; for example, the magnitude [or spatially dimensional mass] of a human being differs from a bird's, and it also differs among various sorts of birds.

Here, the notion of a forming-principle (*logos*) refers to Soul (or, more precisely, to a soul-potency, or concatenation of soul-potencies) insofar as it "conveys" a certain intelligible along with it in its procession from Intellect (or, insofar as a certain intelligible informs its part-by-part operation).

Despite Plotinus' seemingly species-level distinguishing here between a humanity-*logos* and a bird-*logos*, and between various sorts (species) of bird-*logoi*, his Intellect in fact generates its intelligibles until they attain

a level of specificity corresponding to a perceptible substance in the entirety of its detailed particularity. Thus, for example [II.4.9,8–10],

> a particular thing, insofar as whiteness may be present in it, comes-to-be white because that [forming-principle] within this living being produces a white-colored thing, just as various other colors may be present in a variegated thing … because, if you please, it has a variegated forming-principle [with respect to its particular color-pattern].

In Plotinus' Neoplatonism, this correspondence between the detailed specificity of the intelligibles which finally result from Intellect's own procession from the One and the entirety of a natural existent's particularity is implied by his view, discussed previously (in Chapter 9), that perceptibly real substances just are intelligibly real substances (*albeit* insofar as they are "extended" part-by-part as we discern them in sensory experience) insofar as we discern them perceptually (or as perceptibles) instead of intellectually (or as intelligibles). For instance [VI.3.15,29–37]:

> the real forming-principle of a human being is the particular human being … [for example,] since there exists a real forming-principle to which the real Socrates conforms, the Socrates experienced sensorially is strictly speaking not Socrates but so much color and configuration of parts which in reality are [sensorially manifest] images of real existents encompassed by his forming-principle.

Or, in general [II.6.1, 41–43],

> the things we denote as particular existing [perceptible] substances of a given sort are entirely forming-principles which engender the [sensory] qualities we then associate with those particulars.

Plotinus' third main sort of examples, then, focus in turn on the natural universe as a systemically ordered whole, or else on prototypically inanimate and material existents within it (for example, rivers, mountains, fire, earth).

When exploring a geometric conception of his metaphysical system, for example, Plotinus supposes that the immutable model of natural existence is a "singular configuration" (*schemati*) containing within itself "something like measured sketches (*perigraphas*) and measured sketches within measured sketches, the configurations of all things," [VI.7.14, 13–15] inasmuch as, he proposes [VI.4.33,28–31]:

> For, what is there to prevent us from saying that the potency of the soul … produces the universe as a sort of preliminary sketch … and that this sketch is something like preconditioning luminations existing in matter so

> that a soul which continues the work by following a given sort of tracings produces a corporeal thing by detailing the tracing part by part.

Plotinus may not intend this geometrical part-by-part generation of material existents to be itself a dynamic process, or one which takes time; but, it lays groundwork for Plotinus to propose as well that subsequently the natural universe [IV.4.33, 28–31]

> effectively moves its parts in relation to itself, forever reconfiguring its greater parts, as the relationships of its parts to one another and to the whole and their differing consequent dispositions towards one another bring about all the rest [of natural coming-to-be].

A noteworthy feature of Plotinus' proposal here to merge mathematic conceptions of natural existents and processes with his conception of the natural universe as itself an organic unity, moreover, is the implication that the natural universe is thereby considered to be a single dynamic system wherein the comings-to-be of its various parts are sequentially ordered precisely because those which occur 'before' bring about those which occur 'after' in concordance with mathematic principles or conceptions. Plotinus thus maintains that the natural universe is "living throughout," so that even things not commonly considered animate possess their own "hidden life" [see IV.4.36].

As an entirety, accordingly, natural existence is a living unity and possesses a "*logos* of living unity" [IV.4.11,1]—a soul which "binds it together" [IV.3.9,43]—so that we may consider the conditions and positions and structures of every thing within it to be analogous to the parts of a single living being [see IV.4.33,26–33]. For, the natural universe is not just a sequence or a collection of things but a "weaving together" of all things [III.2.15,2].

Consequently, Plotinus is finally able to proclaim that time does not pertain just to regular motion but to every manner of natural existence and motion—and so including irregular motion, pauses or absences of motion, and even perceptible substances as they "endure" or "persist" through time [III.7.13, 46–49]:

> How is it that time is universally ubiquitous (*pantaxou*)? Because likewise soul, too, is not severed from any portion of our universe—just as our own soul is not absent to any portion of ourselves.

How could Soul be severed from or absent to any portion of natural existence or sort of natural existent? For, Soul's generative activity (including as it continuously leaves behind what it has previously generated and "shifts" to what it is currently generating) is the source or

cause of all natural existence, whose vital and unceasing organic unity especially bespeaks its coincident temporality—even while its temporality is such that what has been no longer is, and what will be is not yet.

Thus, everything in nature indeed comes-to-be by virtue of time, whose effects bespeak its causality as a form of life—a form of life which distinguishes natural existence from the eternal existence it therein nevertheless displays ("images").

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INDEX

A-series (McTaggart), 69–73
accidental being (or time), 150, 214, 220, 305–307, 314, 349, 352
the Achilles argument, 246–248, 260, 261
active power (also 'actual potency'), 13, 344, 349–355, 360, 361
actual being (also 'actuality')
  in Aristotle 11, 194, 202–208, 237, 263–270
  in Plotinus 13, 285, 290, 293–315, 319, 322–329, 345–356
Anaxagoras, 183, 184
appearance(s), 59–61, 122–127, 134, 138, 153, 157, 248, 250, 277, 278, 322, 323, 349, 352
Aristotle, 8–15, 73, 82, 88, 102, 117, 120, Part II *passim*, 275, 276, 282, 286–317, 320–323, 328–335, 339–349, 354
Armstrong, A. Hilary, 275, 324
the arrow of time, 5, 6, 44, 51–54, 77, 232, 233, 344, 345
astronaut-twin relativity physics example, 89–91, 97
astronomical clock(s), 107
atom(s), 56, 157, 161, 184, 203, 233, 237, 261, 266, 290, 329, 332
Augustine, Saint Aurelius, v, 137

B-series (McTaggart), 69–73
Back, Allan, 234, 235
Barnett, Jo Ellen, 56, 107, 112–116
Bell, P.M., 115
Bergson, Henri, 138, 139, 141, 143
the Big Bang Theory, 58, 117, 231
biological clock(s), 33, 35
the bisection argument, 246, 248–262, 265, 266, 269, 270, 306, 315
the "block" universe, 49, 59, 60, 66, 74, 81, 83, 97, 142
Bostock, David, 120
Brod, Craig, 34

C-series (McTaggart), 69–73
calendrical month, 114, 170
calendrical year (also 'Gregorian year'), 23
canonical hours (Benedictine), 107
Cartesianism, 30, 144
categories (Aristotle), 24, 201, 213, 244–246, 293–295
car-crash relativity causal-order example, 99–102
cesium (atomic) clock, 56, 116, 118, 332
Christensen, F.M., 45, 51, 125, 244
cinematic-affects, 15, 16, 185, 250, 260
cinematographic motion, 15, 60, 61, 145, 250–252, 260, 261
circadian rhythm (or cycles), 34, 35
"civilized" time: see 'modern time'
clock(s): see time-keeping
clockwork universe, 7, 103, 107, 108, 113, 118
color spectrum, 145, 204
common sensibles (Aristotle), 200–203, 206
computer-time, 34
continuous magnitude(s) (or extension), 58, 61, 65, 77, 79, 136, 140–143
  in Aristotle 10, 192–198, 207–210, 214, 218–238, 242–245, 249–251, 254, 256, 259, 265, 269, 270

in Plotinus 292, 295, 309, 314, 322, 324, 328–343, 346–348, 352, 353, 357, 362
cosmic designer (also 'divine artificer'), 104, 107, 108, 187, 275
cosmic expansion, 52, 95
cosmic motion: see 'the Heavens'
cosmic time, 57, 95, 225–229, 344–351
cosmology (also see 'Big Bang Theory'), 9, 54–58, 231, 350, 351
Coveney, Peter, 51
the cubit, 331, 332
cyclical time (also 'circular time'), 5, 44, 54–58, 172, 228, 351, 352, 355

Dainton, Barry, 78, 102, 144
Davies, Paul, 24, 46, 51, 52, 56, 144
the day, 22, 33–35, 104–107, 110–112, 183, 231, 351, 356
definite (or determinate) time (or temporality), 25, 33, 110, 116–118
in Aristotle 154, 155, 163–165, 181–183, 191–194, 199, 200, 203, 204, 207–210, 221, 225–228, 241, 243, 252–256, 265, 270
in Plotinus 301–308, 311, 328–332, 329, 337, 351–354
descriptive (or factual) meaning, 36
diminished (or weakened) reality (Cf. 'incomplete reality'), 277, 278, 283, 284
discrete magnitude(s) (or quantities), 113, 143, 210, 245, 250, 251, 290, 314, 353
Dobbs, H.A.C., 135–137
the Dog star, 109
the dyad, 6, 74, 283
dynamical time, 5, 6, 14, 62–67, 75, 77, 88, 102, 120, 121, 144, 163, 224, 233, 245, 249, 256, 344–351

Einstein, Albert, 5, 7, 46, 48, 51, 90–93, 99
Eleaticism, philosophical (also '…, classical'), 5, 11, 27, 44, 58, 59, 63, 65, 68, 76, 78, 150–153, 167, 190, 246, 251, 260, 261, 292
Eleaticism, scientific (contemporary), 27, 44, 45, 49, 58, 60, 78
Empedocles, 54–56, 184
end-terminus
in Aristotle 173, 205, 223, 226, 229, 230, 237, 255–271
in Plotinus 293, 294–299, 302–309, 330–332, 354
entrainment, 33, 34, 35
entropy, 5, 51–54, 58
equinox(es), 22–25, 37, 111
equinoxal year, 23, 111
eternity (also 'eternal'), 12, 65, 104, 114, 179, 275, 276, 281–292, 303, 313, 317, 339–348, 351, 363
experiential time, 7, 32–34, 44, 54, 68, 89, 138–145, 154, 163, 185, 189–206, 215, 243, 323, 324

Fraisse, Paul, 135, 136
Frankenstein, 117, 118
future-time (also 'futurity'), 6, 14, 38–41, 44, 49, 66–80, 95, 128, 154–159, 228–240, 288–292, 334–336, 343, 358
fuzzy (or, *fuzzily real*) existence, existents, 6, 78–80, 160, 237, 308–311, 343, 347

Galileo, Galilei, 56, 115
Gibson, J.J., 28, 136, 138
granular (coarse-grained *v.* fine-grained) time, 119, 195, 203, 207, 332
Great Year (Plato), 58, 105, 176, 177
Greene, Brian, 53, 54, 93, 95
the "growing block" universe, 78

Halpern, Paul, 56, 57
Harner, Lorraine, 133, 136–138
Hawking, Stephen, 1, 46
the Heavens (also 'heavenly spheres'), 9, 55, 104–106, 114, 118–120, 167, 168, 173–175, 178–

180, 187, 213, 220, 236, 275, 309, 315, 318–322, 332, 351–354
Heroes of Sardinia example, 190–195, 217, 219
Highfield, Roger, 51
the hour, 25, 31, 35, 98, 111, 112, 115, 137, 174, 183–186
Hume, David, 27
Husserl, Edmund, 138–142, 144

incidental sensibles (Aristotle), 200–202, 206
incomplete (or partial) reality (or actuality) (Cf. 'diminished reality'), 11, 13, 262–264, 293–297
indefinite (or indeterminate) time (or temporality), 33, 75
  in Aristotle 154, 155, 177, 183–185, 192, 256, 264
  in Plotinus 289, 290, 294, 301, 307, 337, 342, 346, 351, 356
indivisible(s) (also 'infinitesimals')
  in Aristotle 157, 163, 190, 193, 221, 224, 233, 238, 239, 249–251, 258, 260, 266–268
  in Plotinus 289, 290, 302, 303, 307–309, 312, 343
inertial frame(s), 50, 89–94, 97–103, 128, 187
infinite-time, 55, 58, 159–162, 254–259, 301, 307, 308, 342
inherent (or intrinsic) being, 16, 54, 62, 77, 119, 139, 140
  in Aristotle 150, 151, 181, 204, 258
  in Plotinus 283, 287, 296, 300, 306, 309, 258, 283, 287, 296, 300, 306, 309–311, 314, 322, 325, 345, 351–353, 356, 357
instantaneous change (or motion), 78–80, 136, 324
intelligible matter (see also 'dyad'), 283
intelligible reality (also 'intelligibles'), 276–286, 289, 290, 342, 360, 361
Intellect, 12, 15, 16, 216, 278–292, 340–361
internal (or inner) clock, 32–35
internalization approach (to time), 4, 7, 29–36, 49, 124, 126, 153
International Meridian Conference (of 1884), 111, 113

Kant, Immanuel, 125, 126
Kennedy, J.P., 97–101
Koriscon strolling-to-the-market-place example, 218–223, 226–230, 234, 236, 242, 244, 269

Levin, Iris, 88, 89
light-speed: see 'speed of light'
linear time, 5, 44, 54–58
local(ized) time, 95, 98, 113
Locke, John, 133

Manchester, Peter, 11
McTaggart, John, 5, 6, 68–76, 84, 129, 134
mass terms, 183, 184
mathematics and "number(s)", 90, 101–106, 113, 115, 120
  in Aristotle 149, 169–172, 175, 185, 201, 203, 209–211, 214–217, 220, 227, 229, 252–255, 265
  in Plotinus 276, 279, 281, 313, 314, 323, 327, 328, 333, 334, 337, 351, 362
memory(ies), 10, 15, 39, 131–133, 136, 206, 208, 238–242, 246, 269
metaphorical meaning, 26, 27
Michon, John, 32
Minkowski, Herman, 94
the "modern" day, 113
"modern" hours (also 'standard hours'), 111, 113, 116, 241
modern(ized) time (also 'civilized time'), 7, 113–118
the month (also 'lunar month', 'synodic month'), 33, 104–107, 114, 137, 175
Morris, Richard, 50–52, 93–95, 97

Naturalism, 12, 20, 167, 179, 184, 189, 195, 213, 229, 325–327, 340, 344, 347, 355, 356, 362, 363

necessary being (also 'necessity'), 105, 138, 151, 176, 214, 229, 276–279, 306, 317
Necker Cube, 136
Neoplatonism (also 'Neoplatonic'), 12, 14, 275, 339, 340, 344, 346, 357, 361
now-ness (also, 'nows', 'the now'), 28, 40, 45, 74, 128, 129, 132–134, 139–142
  in Aristotle 8–11, 149, 150, 152, 155–165, 176, 182, 190–192, 196–198, 207–209, 216–238, 241–246, 249–251, 258–261, 265–270
  in Plotinus 15, 286, 287, 290, 301–304, 307–312, 335, 336, 343, 344, 350, 357, 358

Occasionalism, 79, 80
the One, 13, 279–282, 290, 340–344, 361
Operationalism, 91–93, 95
organic unity (also 'organic whole'), 15, 16, 139, 285, 359–363
d'Oresme, Nicole, 103, 104, 107, 113

Paley, William, 107, 108
Parmenides (also 'Parmenidean'), 8, 10, 73, 152–155, 167, 168, 176, 228, 246, 344
parts (or, constituents) of time, 6, 8, 73, 74, 104–106, 119, 154–159, 163, 198, 203, 235–241, 245, 249, 319, 334
past-time (also 'pastness'), 6, 14, 38–41, 44, 49, 66–80, 95, 128, 133, 154–159, 228–243, 259, 288, 334–336, 343, 358
perceptible reality (also 'perceptibles'), 9, 13, 14, 145, 196–207, 213, 242, 276–280, 283, 295, 323, 342, 348–350, 353, 361, 362
Phenomenology, 139
Piaget, Jean, 6, 7, 83–89, 120, 125, 185, 214
Planck magnitude(s), 80, 161, 290
Plato (also 'Platonic', 'Platonism'), 7, 9, 12, 58, 102–107, 112, 114, 118, 119, 153, 156, 167–175, 179, 187, 275–279, 282, 285, 347
Plotinus, 12–16, 149, Part III *passim*
potential being (also 'potentiality')
  in Aristotle 11, 162, 202, 203, 230–232, 237, 263–265, 267, 269
  In Plotinus 13, 293–295, 304, 308, 329, 349, 352, 353
present-time (also 'presentness'), 6–8, 70, 73, 74, 128–133, 137, 142, 157, 158, 162, 208, 235–241, 286, 343
principle of isochronism, 56, 115
principle of vacuous contrast, 19–21
protention (Husserl), 140
Pythagoras (also 'Pythagoreanism'), 102, 104, 275

quanta (also 'quantum physics'), 51, 52, 66, 80, 157, 161, 210, 245, 321

regular (and irregular) motion, 315–317, 320, 321, 339, 351–356, 362
relativity theory (also 'relativity physics'), 7, 24, 44, 46, 50, 89–98, 101, 102
retention (Husserl), 140, 141
Rifkin, Jeremy, 32–34, 114, 115
the running-off phenomenon, 140, 141

same-time(ness), 6, 7, 26, 81–87, 89, 91–95, 128, 164, 176, 177, 196, 214, 217, 218, 221, 225, 227, 228, 234, 242
sand clock, 106
Schlesinger, George, 19–21
seasonal year, 23
sensible qualities, 121–126, 200–206, 213, 214, 242
Sherover, Charles, 243, 244
short-term memory (see also 'retention'), 10, 136, 208, 209

sidereal (stellar) day, 111
simultaneity: see 'same-timeness'
Sirius, 109, 110
solar day (also 'diurnal'), 23, 25, 33, 35, 105, 107, 113, 351, 355
solar year ('also 'perihelial year'), 23, 58, 105, 109–111, 170, 175, 332, 333
solstice year, 107, 111
sortal terms, 183, 184
Sothic year, 109, 110
space-like time, 45, 59, 65, 74, 134, 244–246, 258, 265
space-time (also 'spacetime'), 5, 45–50, 59, 77, 94, 97, 145
space-time interval (also '… coordinates'), 94, 95, 101
special sensibles (Aristotle), 200–202, 206
specious present (also 'sensitive present'), 8, 129, 134–138, 141, 343
speed (also 'velocity'), 10, 30, 34, 50, 84–92, 175, 177, 181, 182, 185–187, 195, 212, 325
speed of light, 50, 90–93, 99
the stadium argument, 246
stadium lap-walker example, 299, 300, 305, 359
standard(ized) time, 113, 116–118
start-terminus
  in Aristotle 173, 205, 208, 223, 226, 229, 230, 237, 255–269
  in Plotinus 293, 294, 297, 301, 302, 307, 309, 330–332, 354
static time, 5, 6, 63–67, 72–74, 81, 121, 134, 145, 224, 251, 265
Steel, Duncan, 22, 23, 109–111, 114
stellar year (also 'sidereal year'), 58, 111
Stonehenge, 109
subatomic, 51, 80
subjectivism: see 'internalization …'
sundial, 106, 112, 113
temporal decentering, 133
temporal measure(s), 7, 10, 30–32, 56, 103, 110, 114–116, 155, 170, 210, 211, 216, 222, 227, 314, 321, 322, 325–337, 351–357
temporal order(ing), 6, 25, 26, 48–50, 66, 69, 73–77, 81, 93, 94, 99, 100, 159, 160, 205, 206, 219, 228–230, 245, 259, 336, 341, 344, 345, 358
temporal properties, 37, 38
temporary hours, 112, 113
temporal rate of motion: see 'speed'
temporal rhythm(s) (also 'time-sense'), 32–35, 351–357
tensed language, 39, 40, 44, 67, 234–236, 245, 246
tenseless language, 45, 67
terminus (also 'extremity', 'limit')
  in Aristotle 163–165, 173, 182, 191, 192, 195, 204–207, 225, 226, 230, 232, 236, 242, 243, 259, 262, 263, 267–270
  in Plotinus 293, 296, 302, 307, 308, 329
thermodynamics (also 'second law of …'), 51, 53
time-keeping (also 'clocks'), 7, 24, 34, 35, 53, 56, 81, 92–95, 98, 103, 106–119, 174, 175, 327, 332
time-sense: see 'temporal rhythms'
time-travel, 58
time-units, 85, 86, 116, 119, 161, 169, 170, 175, 176, 220, 227, 334, 351–357
timelessness (also 'atemporal'; see also 'eternal'), 15, 16, 20, 21, 43, 65, 66, 69–71, 74, 81, 104, 167, 189, 281, 284–288, 292, 302–308, 316, 324, 325, 340, 341
transparency (also 'the transparent'), 9, 203–205
the traveling arrow argument, 59, 246, 248–251, 260, 263

units of time: see 'time-units'

vernal equinox naturalism example, 22–26, 69
vitalism, 347, 363
Vlastos, Gregory, 175

water clock (also 'clepsydra'), 106, 112
Weyl, Hermann, 46
White, Michael, 254, 258, 271
Winfree, Arthur, 35

the year, 22, 25, 104–106, 109–111, 137, 156, 214, 227, 228, 246, 334, 337, 356

Zeno of Elea, 10–12, 59–62, 65, 70, 151, 152, 243–252, 255–267, 270, 271, 293, 299, 304–308, 311, 312, 315